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THE TREATMENT OF PNEUMOCOCCIC AND STAPHYLOCOCCIC MENINGITIS WITH PENICILLIN AND SULFONAMIDES

Report of Twenty Cases

WENDELL H. HALL, M.D., JOHN ALDEN, M.B., GEORGIE M. BURT, M.D. and WESLEY W. SPINK, M.D.
Minneapolis, Minnesota

THIS report is concerned with the results of treatment with penicillin in seventeen cases of pneumococcic meningitis and three cases of staphylococcic meningitis. While the number of cases is not large the results are quite encouraging when compared to those obtained before penicillin became available. However, an analysis of the present cases and a review of the literature indicates that pneumococcic meningitis is still a serious clinical problem.

Prior to the general use of the sulfonamides, recovery from pneumococcic meningitis was rarely encountered. Following the introduction of the sulfonamides, especially sulfapyridine, the mortality rate from this disease declined. But even after the completion of an evaluation of other sulfonamides, such as sulfadiazine, sulfathiazole and sulfamerazine, all utilized with and without specific antipneumococcic serum, the results have not been very encouraging. It would appear that the over-all case mortality rate of pneumococcic meningitis following treatment with the sulfonamides varies between 60 and 80 per cent. The former figure approximates the experience at the University of Minnesota Hospitals, while the latter reflects the results of Dingle and Finland[a] in Boston. The results with penicillin would indicate that the mortality rate is around 50 per cent.[7] A summary of 162 patients with pneumococcic meningitis treated with penicillin in different parts of the country reveals that eighty-eight patients died, giving a case mortality rate of 54.3 per cent (Table I). It is of signif-

TABLE I. SUMMARY OF RESULTS WITH PENICILLIN IN TREATMENT OF PNEUMOCOCCIC MENINGITIS AS RECORDED IN LITERATURE

Authors and Reference	No. Cases Treated	No. Deaths	Per cent Mortality Rate
1. A. J. Waring, Jr., and M. H. D. Smith J.A.M.A., 126:418, Oct. 14, 1944	12	1	8.3
2. C. G. Harford, S. P. Martin, P. O. Hageman, and W. B. Woods, Jr. J.A.M.A., 127:253, Feb. 3, 1945	9	1	11.
3. L. K. Sweet, E. Dumoff-Stanley, H. F. Dowling, and M. H. Lepper J.A.M.A., 127:263, Feb. 3, 1945	16	9	56.
4. W. L. White, F. D. Murphy, J. S. Lockwood, and H. F. Flippin Am. J. M. Sc., 210: 1, July, 1945	50	32	64.
5. E. Applebaum, and J. Nelson J.A.M.A., 128:278, July 14, 1945	67	41	61.
6. A. F. Hartman, F. M. Love, D. Wolff, and B. S. Kendall J. Ped., 27:115, Aug., 1945	8	4	50.
Total No. Cases	162	88	54.3

From the Division of Internal Medicine, University of Minnesota Hospitals and Medical School, Minneapolis.
The penicillin was provided by the Office of Scientific Research and Development from supplies assigned by the Committee on Medical Research for investigations recommended by the Committee on Chemotherapeutic and other Agents of the National Research Council.
Dr. Georgie M. Burt was formerly Resident Physician in Pediatrics, Abbott Hospital, Minneapolis.

TABLE II. SUMMARY OF SEVENTEEN PATIENTS WITH PNEUMOCOCCIC MENINGITIS TREATED WITH PENICILLIN

Patient No.	Age and Sex	Duration of Symtoms Prior to Therapy with Penicillin	Primary Focus	Type of Pneumococcus		Treatment Prior to Penicillin	Total Units of Penicillin		Simultaneous Sulfonamide Therapy	Number Days in Hospital	Result	COMMENT
				C.S.F.	Blood		Parenterally	Intrathecally				
1	47 yrs. Male	3 days	Pneumonia Otitis media	III	III	SD., SM.	2,355,000 in 27 days	235,000 in 14 days	SM.–51 grams in 11 days ST.–1 gram in 1 day	37	Recovery	No residual. Cerebrospinal fluid sterile 12 hours after first dose of penicillin.
2	60 yrs. Male	2 days	Otitis media	III	III		1,728,000 in 28 days	90,000 in 7 days	SM.–10 grams in 3 days ST.–2.6 grams in 4 days	56	Recovery	Slight residual weakness right side. Myringotomy day preceding therapy with penicillin. Mastoidectomy 1st day of penicillin therapy. 5th day therapy bronchopneumonia. 7th day evidence left temporoparietal brain abscess. 24th day craniotomy for subdural abscess. 39th day second craniotomy.
3	2½ mos. Female	4 days		V			271,000 in 12 days	69,000 in 12 days	SD.–14 grams in 14 days	14	Recovery	No residual. Temp. normal in 5 days.
4	4½ yrs. Male	4 days	Otitis media	V		SD. and myringotomy	397,000 in 15 days	75,000 in 7½ days	SD.–49 grams in 16 days	14	Recovery	Residual of marked hearing loss.
5	5½ yrs. Male	35 days	Otitis media	VI		SD.–181 grams in 32 days	652,000 in 10 days			42	Died	No penicillin intrathecally. Organisms persisted in cerebrospinal fluid. Autopsy—thick exudate base of brain; dilated 3rd ventricle; ventricles filled with purulent material; no gross abscesses; normal mastoids.
6	25 yrs. Female	7 days	Otitis media	VII		SD. for 7 days; myringotomy	590,000 in 10 days	100,000 in 5 days	SM.–58 grams in 11 days	17	Recovery	No residual. On entry to hospital stuporous (diabetic ketosis); mastoidectomy 5th day in hospital with cosg. pos. staph. from exudate.
7	6 mos. Male	3 days	Pneumonia	XII	XII 2 cols. per c.c.	SM.	443,000 in 21 days	78,500 in 16 days	SM.–7 grams in 6 days	27	Recovery	No residual. Intrathecal block on 6th day of treatment necessitating 3 intracisternal injections of penicillin.
8	7 mos. Male	5 days	Otitis media	XII		SP., bilateral myringotomy	160,000 in 12 days	27,000 in 12 days		12	Recovery	No residual. Rise in cerebrospinal fluid cell count first 3 days of treatment. Convulsions 4th day. 3000 units intracisternally.
9	46 yrs. Female	2 days	Otitis media	XII	XII		520,000 in 2 days	50,000 in 2 days	SD.–19 grams in 2 days	2	Died	Failed to respond. Autopsy-purulent exudate in subarachnoid space; hemorrhagic pneumonia.
10	48 yrs. Male	4 days	Pneumonia	XII	XII	SD.	754,000 in 10 days	241,000 in 9 days	SD.–142 grams in 10 days	10	Died	Temporary improvement. Received penicillin intracisternally. Autopsy—mild meningitis base of brain; cerebrospinal fluid sterile.
11	5 mos. Male	15 days	Otitis media	XVIII		SD., SM., myringotomy	337,000 in 12 days	35,000 in 4 days	SD.–5.5 grams in 5 days	18	Recovery	No residual. Meningitis developed while patient receiving penicillin intramuscularly for otitis media. Mastoidectomy 1st day of therapy—culture sterile. Prompt response to penicillin intrathecally.
12	6 mos. Male	2 days		XIX	XIX 200–250 cols. per c.c.		672,000 in 22 days	30,000 in 7 days	SD.–26 grams in 16 days	36	Recovery	No residual.
13	57 yrs. Male	3 days	Pneumonia	XIX	XIX		885,000 in 10 days	140,000 in 9 days	SD.–170 grams in 18 days	28	Died	Death due endocarditis with rupture of aortic cusp; blood sterile; unresolved pneumonia rt. upper lobe; no evidence of meningitis.
14	7 mos. Female	2 days	Otitis media	XXI		SD.	486,000 in 21 days	54,000 in 17 days	SD.–47.75 grams in 20 days	41	Recovery	Severe residual cerebral damage. Probably diminution of vision and hearing.
15	30 yrs. Male	13 days		XXIII	XXIII	Sulfonamide for 15 days	6,514,000 in 58 days	340,000 in 26 days	SD.–293 grams in 35 days	44	Recovery	One month prior to entry treated for meningitis with penicillin intrathecally and intramuscularly (doses not known). One month later second relapse. Cerebrospinal fluid sterile. Evidence of encephalitis. Third relapse. Biopsy of rt. and left parietal lobes of brain showed encephalitis. Complete recovery with no neurologic residual.
16	58 yrs. Female	3 days	Otitis media	XXXII	XXXII 83 cols. per c.c.		872,500 in 14 days	120,000 in 5 days		22	Recovery	No residual. Myringotomy 2nd day penicillin therapy.
17	10 yrs. Male	35 days	Skull fracture through sinus	XXXIII		SD. and ST. for 29 days	912,300 in 28 days		SP.–21.5 grams in 13 days SD.–13.75 grams in 5 days	17	Recovery	No residual. Improvement following SD. Also received 100,000 units type XXXIII antipneumococcic rabbit serum intravenously and intrathecally without definite improvement. Penicillin given parenterally without benefit. Operative drainage of sinuses followed by prompt improvement and recovery.

TABLE III. AGE DISTRIBUTION OF SEVENTEEN PATIENTS WITH PNEUMOCOCCIC MENINGITIS

Age	Pneumococcic Types	No. Cases	No. Died
0-12 mos.	V, XII, XVIII, XIX, XXI	6	0
1-5 yrs.	V	1	0
5-10 yrs.	VI	1	1
10-20 yrs.	XXXIII	1	0
20-50 yrs.	III, VII, XII, XXIII	5	2
50-70 yrs.	III, XIX, XXXII	3	1

TABLE IV. PRIMARY FOCI IN SEVENTEEN PATIENTS WITH PNEUMOCOCCIC MENINGITIS

Focus	No. Cases
Otitis media	10
Pneumonia	3
Skull fracture through paranasal sinuses	1
Unknown	3

icance that rates considerably lower than this were reported by two groups. Waring and Smith[20] in Baltimore treated twelve patients with penicillin and sulfadiazine or sulfapyrazine and had but one death. Four of the patients received specific antipneumococcic serum in addition but this apparently had little effect on the outcome. These outstanding results stand out in marked contrast to previous experience. Up to 1937, 179 cases of pneumococcic meningitis were treated at the Harriet Lane Home and Sydenham Hospital with a mortality rate of 100 per cent. When sulfanilamide became available, twenty-five patients were treated and twenty-three died. From 1938 to 1943 a total of sixty patients were given sulfapyridine, sulfadiazine or sulfathiazole with and without antipneumococcic serum, and the mortality rate was 58 per cent. They conclude with the recommendation that penicillin and sulfadiazine or sulfapyrazine should be utilized in the treatment of pneumococcic meningitis. Harford and his associates[6] in St. Louis treated nine patients with penicillin and reported but one death. They attribute this favorable outcome, in part, to the fact that five of the patients, in addition to receiving penicillin, had had mastoidectomies, which succeeded in eradicating the primary foci.

A less frequently encountered form of bacterial meningitis is that caused by staphylococci. Although the sulfonamides are less satisfactory antistaphylococcic agents than penicillin, there are several recorded instances of patients recovering from staphylococcic meningitis as a result of sulfonamide therapy, particularly following the use of sulfathiazole.[8,12,13,14,16] There are at least nine recorded recoveries from staphylococcic meningitis following the administration of penicillin.[9,10,18,19]

Pneumococcic Meningitis

In the present series of seventeen patients with pneumococcic meningitis there were thirteen who recovered and four who died giving a case mortality rate of 23.5 per cent. Although the total number of cases is not large there has been a significant reduction of the death rate from this disease associated with the administration of penicillin. A summary of the pertinent clinical data regarding these patients is shown in Table II.

Age Incidence.—The age distribution of the seventeen patients is given in Table III. It is of particular interest that there were six patients under twelve months of age and all of them recovered. There were three patients over fifty years of age with two recoveries. It is well established that pneumococcic meningitis is an extremely serious and frequently fatal disease in infants and in the aged. The present results indicate that penicillin is beneficial in these extremes of life.

Types of Pneumococci.—As seen in Table III no particular type of pneumococcus was predominant as the cause of meningitis.

Primary Foci.—The probable primary focus of infection was established in fourteen of the seventeen patients as shown in Table IV. Of the ten patients with otitis media, myringotomies were carried out in six individuals, all of whom recovered. Two of these six patients also had mastoidectomies. It is not unlikely that eradication of the primary foci in these individuals contributed to the recovery of the patients, a factor which has also been considered by others[6] in the treatment of patients with penicillin. Patient 2 (Table II) was a sixty-year-old patient

under the care of Dr. Jay C. Davis of Minneapolis. He was desperately ill with a meningitis due to type III pneumococci, and it is very doubtful if therapy with penicillin would have resulted in a favorable outcome without radical surgical interference to remove purulent material, which included a myringotomy, mastoidectomy, and two craniotomies for a subdural abscess. Drainage of a primary focus was undoubtedly responsible for recovery in patient 17 (Table II), a patient of Dr. Ray Shannon of Saint Paul. The patient, a ten-year-old boy, developed meningitis due to type XXXIII pneumococci following a fracture of the skull. Roentgenograms revealed a fracture running diagonally upward from the region of the right ethmoid cells and along the medial wall of the right orbit into the right frontal bone for two inches. This patient was the first one of the seventeen patients to receive penicillin and the material was only given intravenously. In addition he received therapy with sulfonamides and type-specific antipneumococcic serum. Because his condition was not improving, on the forty-seventh day of his illness both antra were drained, as well as the sphenoid and ethmoid sinuses. All sinuses were apparently the site of suppuration and following drainage recovery was progressive.

Fatal Cases.—Patient 5 (Table II) was treated with penicillin through the co-operation of Dr. E. J. Huenekens of Minneapolis. He had received sulfadiazine for thirty-two days without improvement and then penicillin was administered intravenously over a period of ten days. No penicillin was injected directly into the subarachnoid space. His condition became progressively worse and he expired. Postmortem examination revealed a thick exudate involving the meninges of the brain. It is possible that penicillin given intrathecally would have caused a more favorable outcome. Patient 9 failed to respond to combined therapy with sulfadiazine, and penicillin administered intramuscularly and intrathecally. Patient 10 was treated similarly, except that penicillin was injected intracisternally, and experienced temporary improvement but death was precipitated by meningitis and a hemorrhagic pneumonia. Patient 13 had apparently recovered completely from meningitis and died of cardiac failure following rupture of an aortic cusp. This patient had an endocarditis although organisms were not recovered from the blood.

Residual Involvement of Central Nervous System.—Although it can be anticipated that more patients will recover from pneumococcic meningitis than prior to the introduction of penicillin, serious and permanent damage to the central nervous system may result. Two patients, at least, were left with marked diminution of hearing (Patients 4 and 14). In addition, patient 14 probably had some loss of vision. In spite of an extremely stormy clinical course, which included several operative procedures, patient 2 recovered with only a slight residual weakness of the right side of the body. Patient 15 had three relapses with what was at first considered to be meningitis but exploratory operation defined these relapses as being associated with an encephalitis. The patient finally recovered completely without any neurologic residual.

Treatment.—When penicillin first became available in this clinic for the treatment of pneumococcic meningitis it was not clearly established whether the drug passed the blood-brain barrier and appeared in the cerebrospinal fluid following intramuscular or intravenous administration. Therefore, the first two individuals (patients 5 and 17) did not receive intrathecal injections of penicillin. Subsequently, Rammelkamp and Keefer[13] observed that penicillin introduced intravenously into normal human beings did not pass the blood-brain barrier. Later, Rosenberg and Sylvester[14] reported that the intramuscular injection of penicillin in patients with meningococcic meningitis was followed by the appearance of appreciable quantities of penicillin in the cerebrospinal fluid. Rammelkamp and Keefer[12] pointed out that penicillin could be safely introduced intrathecally, such a procedure provoking only an increase in leukocytes in the cerebrospinal fluid and, occasionally, headaches. In the present study, after therapeutic failures had resulted with the first two cases, it appeared logical and desirable to administer penicillin intravenously or intramuscularly and also intrathecally. Early reports indicated that the treatment of patients having pneumococcic meningitis with penicillin alone left much to be desired. The case mortality rates still exceeded 50 per cent. In view of this, the policy established in this clinic was to administer both a sulfonamide and penicillin to patients with pneumococcic meningitis. Either sulfadiazine or sulfamerazine or their sodium

salts were given orally or intravenously, and penicillin was injected intravenously or intramuscularly, and also into the subarachnoid space.

For adults, 10,000 Oxford units of penicillin were dissolved in sterile physiological saline solution and injected intrathecally after an equivalent amount or more of cerebrospinal fluid was withdrawn. This was repeated every twelve thours for the first few days, and then as improvement took place, injections were given every twenty-four hours. In the patients who recovered, and exclusive of patient 15, intrathecal therapy was carried out for an average of seven days. An initial dose of 50,000 to 75,000 units of penicillin was administered as an intravenous drip, which was followed by the intramuscular injections of 10,000 to 50,000 units every three hours. The duration of treatment with penicillin averaged twenty-one days with an average total of about 1,500,000 units given to the patients who recovered. It is to be noted again that patients 5 and 17 did not receive penicillin intrathecally and as a result neither patient manifested improvement. Sulfadiazine or sulfamerazine was given concurrently in doses which maintained a blood concentration around 10 mgs. per 100 c.c. One individual (patient 16) did not receive treatment with a sulfonamide, and she recovered.

In the infants and small children, from 3,000 to 5,000 units of penicillin were introduced intrathecally every twelve hours during the initial days of therapy, and then daily. The average period of intrathecal therapy was ten days. From 3,000 to 4,000 units of penicillin were given intramuscularly every three hours. The average total amount of penicillin utilized was 450,000 units which was administered over a period of sixteen to seventeen days. Sulfadiazine or sulfamerazine was employed as in the adults in doses which provided a blood concentration of 10 mgs. per 100 c.c.

There are some reports[11,14] in which the necessity of injecting penicillin intrathecally in the treatment of meningitis is questioned. While there is no doubt that penicillin will appear in the cerebrospinal fluid in patients with inflamed meninges when the drug is given intramusculary or intravenously, and that because of the extreme susceptibility of meningococci to penicillin, meningococcic meningitis may be treated without the direct introduction of penicillin into the subarachnoid space, the foregoing experience in this clinic indicates the desirability of using penicillin intrathecally in the treatment of pneumococcic meningitis. Experience with patient 11 illustrates in a dramatic fashion the value of giving penicillin intrathecally. The patient, a five-month-old male child, had otitis media on the left six weeks before entry to the hospital. Following treatment with sulfadiazine, the symptoms and fever promptly subsided. Two weeks later, otitis media recurred and he again appeared to respond quickly to therapy with sulfadiazine. Two weeks later, the same ear was again involved and a myringotomy revealed a purulent discharge. The infant did not respond satisfactorily to either sulfadiazine or sulfamerazine and hospitalization was advised. Treatment with penicillin was instituted, 5,000 units being given intramuscularly every three hours. However, the child failed to improve and on the third day of penicillin therapy there were signs of meningeal irritation and a lumbar puncture yielded type XVIII pneumococci. Then 5,000 units of penicillin were introduced into the subarachnoid space. Although a mastoidectomy was performed no evidence of infection was demonstrated. Following the initial intrathecal injection of penicillin there was prompt clinical improvement, and a culture of the cerebrospinal fluid twenty-four hours later remained sterile. Three more doses of 10,000 units each were given on the three succeeding days. The baby was also given sulfadiazine orally and penicillin intramuscularly. A total of 372,000 units of penicillin was utilized and the child made an uneventful recovery.

It has been of importance to determine whether the salts of penicillin have an irritative effect upon the central nervous system and the meninges. Walker and Johnson[19] observed that the application of commercial penicillin to the cerebral cortex of cats, dogs, monkeys and human beings produced convulsive manifestations. The convulsive and antibiotic factors appeared to be closely related. Sweet and his associates[18] report severe neurologic reactions following the intrathecal injection of penicillin in human patients with pneumococcic meningitis, but relatively high doses of penicillin were used. Likewise, a single instance has been reported by Siegal.[16] No untoward reactions followed the intrathecal injection of penicillin in this clinic, and this may be related to the fact that the doses of penicillin rarely exceeded 10,000 units daily or twice daily.

TABLE V. SUMMARY OF THREE PATIENTS WITH STAPHYLOCOCCIC MENINGITIS TREATED WITH PENICILLIN

Patient No.	Age and Sex	Duration of symptoms Prior to Therapy with Penicillin	Total Units of Penicillin		Simultaneous Sulfonamide Therapy	Number of Days in Hospital	Results	Comment
			Parenterally	Intrathecally				
1	3 weeks male	3 days	277,750 in 13 days	66,000 in 13 days	9 grams SD. in 18 days	42	Died	Primary focus was meningomyelocele. *Staphylococci* and *E. coli* in CSF. Former eradicated from CSF, but E. coli persisted. Autopsy—revealed bronchopneumonia and meningitis.
2	7 weeks male	5 days	161,000 in 20 days	38,000 in 19 days	19 grams ST. in 27 days; 1 gram SD. in 1 day	31	Recovery	No residual.
3	8 weeks male	2 days	967,000 in 54 days	120,000 in 32 days	44.5 grams SD. in 54 days	57	Recovery	No residual. Developed epidural abscess at site of lumbar intrathecal injections which was eradicated by local use of penicillin.

McCune and Evans[9] have pointed out that when penicillin is injected intrathecally in the lumbar region minimal amounts were found in the fluid of the ventricles two hours later, and have suggested that on some occasions it may be necessary to introduce penicillin directly into the ventricles. The results of White and his group[21] reveal a lower case mortality rate in pneumococcic meningitis when penicillin was introduced into a higher site than the lumbar region, and they have recommended that the penicillin should be given into the cisterna magna.

Summary

The following specific therapeutic recommendations are essentially those being carried out at the University of Minnesota Hospitals at the present time.

1. Adults. As soon as the diagnosis is established sulfadiazine or sulfamerazine is given orally or parenterally so that blood concentrations of at least 10 mgs. per 100 c.c. are quickly established and sustained. It is doubtful whether higher levels are necessary. Penicillin is given intramuscularly in doses of 20,000 units every two hours for the first twenty-four hours, and then the same dose is given every three hours. Penicillin therapy is continued until the temperature has remained normal for forty-eight hours and blood cultures remain sterile. Sulfonamide therapy is carried out for at least one week after all signs of the infection have abated and the cerebrospinal fluid is normal. Penicillin is injected every twenty-four hours intrathecally in the lumbar region employing 10,000 units in 10 c.c. of sterile physiologic saline solution. This penicillin solution is introduced immediately after the withdrawal of at least 10 c.c. of cerebrospinal fluid. Intrathecal therapy should be continued as long as organisms are present in the cerebrospinal fluid. If the fluid is sterile, intrathecal injections should be given as long as the fluid is cloudy or the concentration of sugar is diminished. In desperate situations it may be advisable to inject the penicillin into the cisterna magna.

2. Infants and Small Children. Essentially the same procedure is carried out, except that the doses of penicillin given intramuscularly are 5,000 units, and 2,500 to 5,000 units are injected intrathecally.

Staphylococcic Meningitis

Three patients with staphylococcic meningitis were treated with penicillin. They were male infants, three weeks, seven weeks and eight weeks of age. Two of three infants recovered completely. A summary of the clinical data on these patients is given in Table V. The one infant three weeks old that died had a meningomyelocele as a primary focus of infection. Staphylococci and *E. coli* were isolated from the cerebrospinal fluid. Following the parathecal and intrathecal use of penicillin and the oral administration of sulfadiazine, the staphylococci were eradicated from the cerebrospinal fluid but *E. coli* persisted until death. Postmortem examination revealed bronchopneumonia and purulent meningitis.

These infants were treated in practically the same manner as described for those having pneumococcic meningitis. However, it was necessary to administer daily up to 3,000 units of penicillin intrathecally for a longer period before the cerebrospinal fluid remained sterile. It is of interest that patient 3 developed an epidural abscess at the site of repeated lumbar punctures which was eradicated by the local instillation of penicillin.

It is recommended that staphylococcic meningitis be treated in the same manner as pneumococcic meningitis, that is, sulfadiazine and penicillin should be used systemically and penicillin should be injected intrathecally. That treatment with penicillin intrathecally is probably essential is borne out by the experimental observations of Pilcher and Meacham.[19] Experimental staphylococcic meningitis in dogs was not benefited by the intravenous use of penicillin, but the intrathecal injection of penicillin was followed by a mortality rate of 54 per cent as compared to 93 per cent in infected controls.

Comment

While treatment with penicillin and the sulfonamides has afforded a more favorable outlook for patients with suppurative meningitis, continued improvement in the case mortality rate and the ultimate outcome of the patient who recovers are dependent upon other factors. It is extremely important that a diagnosis should be established early in the course of the disease and that favorable facilities should be available for early treatment. If the initial examination of the cerebrospinal fluid reveals evidence of a suppurative involvement of the meninges, but precise bacteriologic information must await further study, one is justified in beginning treatment immediately. Following identification of the etiologic micro-organism, the course of treatment may be altered if necessary. Meticulous nursing care and supportive measures are stressed only because of their importance. The attending clinician should examine the patient at frequent intervals with particular attention to suppurative foci which may require surgical intervention for eradication. The state of the patient's hydration and nutrition should be evaluated and corrected when indicated. In conclusion, attention to the foregoing measures in treatment has contributed to the favorable outcome of the majority of patients reported at this time.

Summary

1. Seventeen patients with pneumococcic meningitis were treated with penicillin and thirteen recovered. Sixteen of the seventeen patients received both penicillin and sulfadiazine or sulfamerazine.

2. Three infants with staphylococcic meningitis were treated with a combination of penicillin and sulfonamides and two recovered.

3. It is recommended that in the treatment of suppurative meningitis due to pneumococci or staphylococci penicillin should be administered intravenously or intramuscularly and intrathecally. In addition, sulfadiazine or sulfamerazine should be given orally or parenterally, but not intrathecally.

4. The importance of early diagnosis, supportive treatment and eradication of suppurative foci are stressed.

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COMPOUND, COMMINUTED FRACTURES OF THE SKULL IN BATTLE CASUALTIES

MAJOR GEORGE S. BAKER, MC, AUS,
Rochester, Minnesota
and
CAPTAIN HARVEY CHENAULT, MC, AUS,
Atlanta, Georgia

THE percentage of combat troops that die on the field of battle because of severe craniocerebral injury is not available at this time. Ascroft[1] has aptly stated that "The head wounds which are not immediately fatal are less lethal and crippling than is popularly believed, and the proportion of men who return to duty even after severe, penetrating injuries is much higher than was anticipated." Campbell[2] has reported his experience at an oversea center for treatment of injuries of the head on 100 consecutive battle casualties with compound, comminuted fractures of the skull. Of this group, five patients died of deep infection, twenty-three were returned to duty in the theater of operations and seventy-two were evacuated to the zone of the interior. The patients who had severe craniocerebral injuries and who were returned to the United States were usually received in a general hospital serving as a neurosurgical center. Here the definitive neurosurgical treatment and final disposition were completed. This report is based on seventy-two consecutive cases of injuries of the skull encountered at one such neurosurgical center (Lawson General Hospital) and perhaps the data are representative of the soldiers wounded in combat who are being received at other general hospitals in this country.

Only the soldiers who were actually injured in the field of battle and who sustained a compound, comminuted fracture of the skull were selected, so as to eliminate any disparity in the type and promptness of definitive surgical treatment. The first seventy-two patients who met these requirements were studied so that a final opinion could be reached with regard to end results by combining the data on them with the data on Campbell's original 100 patients, 72 per cent of whom were evacuated to the zone of the interior.

After the injured soldier had been admitted to the hospital, his neurologic evaluation, as far as damage to the brain was concerned, was of primary importance. The patients that could be rehabilitated for military duty and those that demonstrated neurologic defects that incapacitated them for duty could be decided on. The treatment that was necessary for all patients included the control of residual or persistent infection, the rehabilitation and conditioning of the paralyzed and aphasic patients, control of convulsive seizures, removal of intracerebral foreign bodies and the repair of defects of skull and scalp. Everything was done to guarantee that the soldier was returned to the Armed Forces or to civilian life in the best possible physical and mental condition and that he received maximal hospital benefits.

Some of the returning soldiers who had compound fractures of the skull required no actual neurosurgical treatment in this country, as the necessary surgical treatment had been completed overseas. Improvement of the incomplete motor paralysis was invariably proportional to the excellent early débridement of the craniocerebral injury and the intensive rehabilitation measures instituted in the centers overseas. The hemiplegic patients who were received at Lawson General Hospital often were greatly helped by the application of an ordinary footdrop brace of the type used in cases of paralysis of the peroneal nerve or sciatic nerve, since the use of the brace improved the mobility and inhibited the spastic extension of the ankle. Physical therapy and occupational therapy were considered of extreme value in the rehabilitation program. Of the seventy-two patients selected, eleven required no further surgical treatment at this hospital.

The craniocerebral injuries requiring surgical procedures at Lawson General Hospital could be divided readily into several large groups: those requiring removal of retained fragments of bone or foreign bodies, those requiring repair of defects of the skull, those with persistent infection

Dr. Baker was released from the armed forces on December 24, 1945, and is now consultant in neurosurgery at the Mayo Clinic, Rochester, Minnesota.
Dr. Chenault is with the Neurosurgical Section, Lawson General Hospital, Atlanta, Georgia.

of scalp, skull, brain or meninges, and a combination of any of the foregoing three groups.

Nine patients of the seventy-two selected arrived with persistent infection of the scalp, skull, brain or meninges. Three of these patients had a definite cerebral abscess. Retained intracerebral fragments of bone were found to be the source of trouble in most of the cases of persistent, purulent drainage. It was clearly demonstrated to us that with the use of chemotherapy the drainage ceased as long as penicillin or sulfa derivatives were being employed but infection always recurred when administration of the drugs was discontinued. Infection was controlled only by surgical excision of the infected sequestra. When the infection was inhibited by chemotherapy, removal of fragments of bone at the time of cranioplasty rarely caused any serious complications. Our experience has been that it is well to saturate the patient with penicillin before the intracerebral fragments of bone are removed, even if as much as six months has elapsed since his injury. In one case, in which the patient had been injured six and a half months prior to admission, hemolytic streptococcal meningitis quickly developed and positive cultures were obtained from the fragment of bone when it was removed. This patient responded well to administration of penicillin and sulfadiazine and made an uneventful recovery. Fibrin foam saturated in thrombin and penicillin was of value in maintaining concentrated bacteriostatic and hemostatic agents in a localized area. Frank cerebral abscesses were invariably drained surgically and this treatment was supplemented by the parenteral and local use of penicillin. Once the sequestra had been removed or the abscess drained, the clinical signs of infection disappeared. A tantalum plate could be used to cover the large defect in the skull within six weeks to two months from the time of cessation of drainage, in the majority of cases, provided prophylactic chemotherapy was employed prior to, and for several days after, the operation.

The policy of the Neurosurgical Section at Lawson General Hospital has been to remove intracerebral fragments of bone because of their known tendency to prolong purulent infection or to serve as a possible nidus for cerebral abscess and also because they increase formation of cerebral scars and the number of convulsive seizures. In eighteen cases of the seventy-two removal of intracerebral fragments of bone was deemed advisable. Metallic foreign bodies were removed at the time of excision of depressed fragments of bone only if they were readily accessible. Rarely did we feel that it was necessary to operate specifically for metallic fragments as normal brain tissue is often unecessarily damaged by such a procedure.

The plastic repair of a large defect of the skull by means of a tantalum plate was recommended to sixty of the seventy-two patients who had compound, comminuted, depressed fractures of the skull. The actual psychologic benefit from closure of a defect of the skull was a noticeable factor and it was of interest to note that the patients who had the most damage to the brain and the greatest physical disability were often the most insistent on having a tantalum cranioplasty. Our experience indicates that the post-traumatic symptoms of postural headache and dizziness are greatly improved by closure of a defect of the skull. The protection of the brain from trauma and the restoration of the normal cosmetic appearance of the skull are obviously important reasons for closing the defects.

Unfortunately the underlying damage to the brain is not affected by repair of the skull. The electro-encephalographic data noted on the entire group indicate that abnormal brain waves are the rule rather than the exception. However, a surprisingly small group of the patients had a recorded incident of a convulsive seizure or an observed attack. Only fifteen patients of the seventy-two were known to have had a convulsion but from the electro-encephalographic data perhaps 35 to 40 per cent may have convulsions at some future time. All patients who had abnormal brain waves were maintained on anticonvulsive drugs. The incidence of neurologic defects was high. In 41 per cent of the cases there was some form of aphasia, hemiplegia, hemianopsia, spastic paraplegia or sensory disturbance at the time of final disposition.

The data compiled from seventy-two consecutive cases, observed at Lawson General Hospital, of compound, comminuted fractures of the skull resulting from injuries sustained in actual combat perhaps represent a fair estimate of what has been noted elsewhere. By combining Campbell's figures for the combat area with our figures for an Army general hospital in the zone of in-

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VERTIGO IN HYPOTHYROIDISM

A. G. ATHENS, M.D.
Duluth, Minnesota

VERTIGO has been aptly defined as "a consciousness of disordered orientation of the body in space." Objects may appear to be moving or the individual may feel that he himself is moving. It is a very common symptom and because of its relation to pathology in the labyrinth of the ear or to extra-ocular muscle imbalance, patients eventually consult or are referred to the opthalmologist or otologist in search of the etiology.

Vertigo has been classified by Brain[2] into seven types, determined by the neurological level at which the causative lesion occurs. These are: (1) psycogenic; (2) cortical; (3) ocular; (4) cerebellar; (5) brain stem; (6) vestibular nerve; (7) aural. Aural or labyrinthine vertigo resulting from some disturbance in the inner ear is by far the most common of these. The commonly mentioned causes for aural vertigo are: (1) infection, resulting in purulent or serious labyrinthitis; (2) drugs—notably alcohol and quinine; (3) middle ear disease; (4) bacterial toxins; (5) allergy; (6) thrombosis or hemorrhage into the labyrinth; (7) high blood pressure; (8) labyrinthine dropsy or "hydrops of the labyrinth," now thought to be the status in advanced Ménière's disease; (9) functional.

Little difficulty is encountered in differentiating aural vertigo from any of the others, except possibly in the early stages of eighth nerve tumor. Here deafness is more profound and permanent and other nerves, notably the 6th and 7th, are liable to be involved. It has been much more difficult to determine with certainty the etiologic factor in a given case of aural vertigo. Infectious labyrinthitis is a fulminating, destructive disease usually causing complete deafness and ending in meningitis. Vertigo from drugs and bacterial toxins is transient and relieved with elimination of the foci of infection or cessation of the drugs. Elimination of infection, granulations and cholesteatoma in middle ear disease should relieve vertigo from this cause. Vertigo due to allergy is rare. The author has seen a case in a young woman who had repeated attacks of vertigo, nausea and vomiting apparently brought on by ingestion of eggs. After exhaustive search for other causes this case was classified as allergic labyrinthitis. The patient remained free from attacks as long as eggs were eliminated from her diet. Thrombosis or hemorrhage into the labyrinth is probably rare and may be confused with Ménière's disease. The vertigo is of longer duration and hearing loss is permanent. Some writers have mistakenly assumed Ménière's syndrome to be due to hemorrhage because Ménière did describe a case of labyrinthine hemorrhage. The mechanism by which vertigo can be induced by high blood pressure is not clear. It apparently does occur in some cases when no other cause can be found.

Ménière's disease is now considered to be a clinical entity, in which recurring attacks of vertigo are the outstanding characteristic but which also develop deafness and tinnitus and, in severe attacks, nausea and vomiting and which shows at autopsy (in all of approximately a dozen cases so studied) extensive dilatation of the endolymphatic spaces, in particular the choclear duct, the saccule and the utricle. It is generally agreed that the condition is non-inflammatory but there is no general agreement on the etiology. Nelson[14] found that there is water retention in Ménière's disease. Hallpike and Cairns[9] first studied the pathology of the internal ear in Ménière's disease. The outstanding feature in their two cases was gross dilatation of the endolymphatic system.

The group designated here as "functional vertigo" will include all those other cases which show no middle ear or intracranial pathology, but who are subject to periodic attacks of vertigo, at times with nausea and a sensation of fullness or a drumming in the ears but who only occasionally show any appreciable deafness. Next to vertigo these people complain of an almost constant fatigue. They get up tired in the morning and with great effort start the day's work. They are capable of doing as much or more physical or mental work than the average individual, but they have to drive themselves to it.

The majority of these patients have low blood pressure. They probably have more than the average amount of gastro-intestinal disturbances.

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In many cases, headache is an outstanding symptom. Many show some vasomotor instability. The most characteristic finding in individuals with this syndrome is a low basal metabolic rate. It is not however, as low as that found in myxedema. Occasionally these patients, particularly those in their teens, show a slight tendency to put on weight but the majority tend more to be underweight. Thick, dry skin, dry hair, mental sluggishness, all characteristic of myxedema, are conspicuous by their absence. There is no increased skin pigmentation nor evidence of tuberculosis to suggest Addison's disease.

Vertigo complained of by these patients has all the characteristics of a true vertigo and not merely a "lightheadedness" or syncope. As patients generally describe the sensation of objects, such as pictures on the wall, rotating back and forth it is evident that the attacks are often accompanied with nystagmus. Many state that, if standing, they are compelled to sit or lie down or grasp some object to keep from falling. The first attacks are often alarming. The attacks usually last a few minutes but have continued and kept some patients prostrate for several hours. One woman stated that she was unable to open her eyes for as long as twelve hours. Attacks tend to recur on movement of the head for varying periods of time. They occur at irregular intervals and several patients had frequently recurring attacks for several weeks at a time. A goodly number have had attacks at night and others on getting out of bed in the morning. A typical case is that of a forty-two year-old policeman, a robust individual weighing around 180 pounds, all muscle, of ruddy complexion and the picture of perfect health. He awakened one night violently dizzy and felt as though he were falling out of bed—the room seemed to be turning over and over and he was nauseated. The attack passed off in a matter of minutes but he was a little unsteady for several hours. In the course of the next few days he had several attacks. Thinking that his trouble was due to his eyes he consulted the writer. The ears and eyes showed no abnormality. The only abnormal finding was a metabolic rate of minus 36. He admitted feeling tired a great deal of the time. He was given desiccated thyroid gland which he has since taken daily. He has had no more attacks of vertigo over a period of a year and a half and his fatigue has been relieved.

A total of thirty patients, who were referred by other physicians or who came because of vertigo have been collected. Twenty-two of these were seen within the last two years. They range in age from fourteen to seventy-three. The majority are between thirty and fifty. There are twenty females and ten males. Vertigo was constant in all, fatigue in all but one. Ten complained of headaches, usually in the morning. In most the fatigue was also most marked in the early morning. A few had mild tinnitus. One, a thirty-four-year-old woman who gave a history of marked fatigue and recurring attacks of vertigo, often with nausea and tinnitus over a period of fourteen years, showed a hearing loss of 68 decibles in one ear and 15 decibles in the other ear. Her family physician, who saw her in one attack noted nystagmus. This patient could qualify, by all the known standards, as a case of Ménière's disease. Many complained of vague eye discomforts and fatigue on reading. One had bilateral keratoconus. One had an old retinal scar of long standing in one eye. The majority of the others had low grade refractive errors with normal corrected vision. No cases were included who showed middle ear disease, or even a perforated ear drum. Two patients gave a history of mild epileptic attacks. One of these was moderately obese but mentally alert and active. One was seen during a normal pregnancy. On the whole they were otherwise a very healthy group. In this group there were teachers, students and professional people. Their mental ability is probably above the average.

On examination, the majority had blood pressures ranging from 110 down to 90 systolic. Two had mild hypertension and several were seen with pressures normal for their ages. Many exhibited some vasomotor irritability such as cold, perspiring hands and feet, hot flashes and easy flushing. Basal metabolic rates ranged from minus 7 to minus 40 and averaged minus 18. Blood cholesterol, said to be uniformly elevated in hypothyroidism, was not determined in these patients.

A number of other patients were seen during this study with the characteristic symptoms of vertigo and easy fatigueability in whom the basal metabolic rate was reported from minus two to minus five or six. For various reasons the test was not repeated and these patients were excluded from the series. The limit on the basal metabolic

TABLE I

	SEX	AGE	SYMPTOMS	B.M.R.	B.P.	COMPLICATIONS	TREATMENT	RESULTS
M.E.N.	M	46	Dizzy attacks, eyes tire, fatigue.	—21	104/70	0	X	Relieved
E.S.L.	F	34	Dizziness (nocturnal) 14 years; nausea; nystagmus; fatigue.	—19		Deafness 69 dec. Lt. Deafness 15 dec. Rt.	X	Relieved
R.W.R.	M	31	Dizziness; morning fatigue; eyes tire.	—20	98/60	Formerly gastric ulcer (X-ray negative).	X	No report
E.B.	F	43	Dizziness; fatigue; nausea; eyes tire.	—11	108/60	Epileptic convulsion twice a year.	X	Relieved
T.W.	M	73	Dizzy attacks.	—19	102/ to 136/	0	X	Relieved
J.L.A.	M	47	Dizziness; morning fatigue.	—28	138/80 to 190/	Deafness 13 dec. Rt. 6 dec. Lt.	X	Relieved
M.E.O.	F	42	Dizziness (fell once).	—23	"Low"	Incipient cataract.	X	Relieved
T.A.	F	41	Dizziness; eyes tire; morning fatigue.	—9	110/70	0	X	Excellent, complete relief.
H.R.	F	56	Dizziness; (nocturnal); morning fatigue. Neuralgia; "unconscious" spells.	—16	140/88	0—histamine did not relieve.	X	Relieved, stopped treatment.
E.D.	F	31	Vertigo; headaches; fatigue (nocturnal)	—12		0	X	Relieved
N.L.	F	32	Dizzy attacks (nocturnal) "all her life."	—40	90/	0	X	Relieved
I.V.	F	14	Dizzy attacks (nocturnal), headaches.	—19	130/	0	X	Relieved
F.H.	F	47	Dizziness; fatigue.	—14	130/		X	Only one or two attacks since treatment began.
D.M.	M	44	Dizzy (nocturnal); fatigue.	—36	118/70	0	X	Relieved
W.R.	F	23	Dizziness; "ears blocked" one month.	—11	100/ to 135/	Normal pregnancy.	X	Relieved
E.P.	F	34	Dizziness; headaches; blurred vision; nervous.	—20		0	X	Relieved
P.A.	M	26	Headaches; fatigue.	—14	130/	0	X	Relieved
F.R.	F	51	Violent dizziness; frequent morning headaches.	—20	142/86	0	X	Relieved
C.W.P.	F		Dizzy attacks.	—11		0	X	Relieved
C.S.	F	17	Dizzy; fatigue.	—17	118/	0	None	
I.G.W.	F	40	Dizzy attacks (nocturnal); nausea; headache.	—14	105/68	Keratoconus. Old polio.	None	
R.A.C.	M	31	Headache; dizzy attacks.	—7	108/60	0	None	
J.M.	F	57	Dizzy; "eyes don't focus."	—12	103/65	0	X	Relieved; "made a new woman of me."
W.E.	F	32	Fatigue; dizziness; headaches.	—29	120/80	Epilepsy since 14; moderate obesity.	X	Relieved of vertigo. Feels much better.
W.McG.	F	26	Fatigue; frontal headaches; constant dizziness.	—22	130/80	0	X	Relieved
M.S.	M	55	Violently dizzy (nocturnal).	—77	110/	0	X	No more attacks of vertigo. Feels fine.
W.J.	M	18	Very dizzy; removed from game two times.	—10		0	X	Relieved
L.S.	M	45	Dizziness; morning fatigue; eyes tire.	—7	146/80	0	None	
M.S.A.	F	47	Dizziness (nocturnal); fatigue; headache.	—25	130/	0	X	Relieved. No vertigo.
E.A.A.	F	19	Dizziness (nocturnal); fatigue.	—28	120/	0	X	No vertigo. Feels fine.

rate was arbitrarily set at minus seven. It is expected that there will be criticism for setting the limit so close to normal, as the statement is frequently made that a basal metabolic rate of less than plus or minus 10 or 15 is meaningless and of no value. This assertion cannot be supported. While it is true that anxiety, lack of rest, iodine, food and many other factors may have the effect of giving an erroneously high basal metabolic rate reading, none of these factors, in fact nothing except certain endocrine disturbances, drugs and debilitating diseases, is liable to give an erroneously low reading. The readings are generally inclined to indicate a higher rate of metabolism than would be found if stimulating factors could be completely excluded. Warfield[18] points out this fact and stresses the point that a lowered rate, with symptoms, should be seriously considered. Two patients in this series who gave basal metabolic rates of only minus seven had severe attacks of vertigo with nystagmus. One was a city bus driver who, on one occasion, was compelled to stop his bus until he recovered his equilibrium. The other, a professional man, was awakened at night with violent vertigo and nystagmus and was unable to move, even to turn his head, without precipitating further attacks. He was at home alone and became alarmed, fearing he was having a "stroke." He admitted almost constant fatigue at the beginning of the day. His symptoms were completely relieved by thyroid therapy. He has had no more attacks of vertigo. His fatigue is prevented with two to three grains of thyroid extract daily.

These cases are not classified as Ménière's disease, though there seems to be no clear-cut line of distinction between cases such as these and those with the classical clinical picture of vertigo, tinnitus, deafness and nausea, generally said to constitute Ménière's syndrome. There is lack of agreement, even among those who insist on a strict adherence to Ménière's original description of the symptom complex, as to just what is necessary for a diagnosis. While some authors insist on a complete picture, others classify cases with vertigo alone in individuals with no demonstrable clinical pathology in the ears, as Ménière's disease. Horton[11] does not believe that hearing loss is necessary to make a diagnosis of Ménière's disease. Lindsay[12] states that it is sometimes possible to distinguish three stages of Ménière's disease. In the first stage, according to Lindsay, vertigo alone exists and may appear several weeks or months before tinnitus and deafness appear. The second stage is characterized by vertigo and fluctuating auditory symptoms. In the third stage vertigo may be absent or seldom present, deafness is marked, tinnitus fluctuates and the caloric response, which is normal in the first and second stage, is now diminished.

Two cases in the writer's series had definite hearing loss and several had mild tinnitus and nausea. The vertigo is certainly no different and no less severe than that described in many cases reported as Ménière's disease. Are these, then, cases of early Ménière's disease and will they progress to advanced stages of deafness with dilated endolymphatic spaces? Or does Ménière's disease so commonly exist in mild form? Except for the single symptom of vertigo the identical clinical picture found in these cases has been reported in a number of papers on hypothyroidism by Seward[16], Higgins[10], Warfield[18] and others. These reports were made by internists and this may account for the fact that vertigo was not mentioned. Patients with vertigo quite naturally relate this symptom to some disturbance of their eyes and ears and seek relief from the opthalmologist or otologist. Several clinicians with whom the writer consults are now increasingly finding low basal metabolic rates in patients with vertigo as an outstanding symptom. All the above-mentioned authors lay great emphasis on the fatigue which is a constant finding in their cases.

It seems rather strange that only twice in the literature was mention of low metabolism found in connection with vertigo. Lindsay[12] briefly mentions "recurring attacks of vertigo without auditory symptoms in individuals with low blood pressure and low basal metabolic rate." He states that in some of these cases it is possible to locate the lesion in the central nervous system. He further states that in some such cases hearing loss occurs and it is then possible to diagnose them as Ménière's disease. Lindsay also mentions fatigue, depression and vaso-motor instability as common symptoms occuring in Ménière's disease. Weiss[19], writing on the subject of vertigo, states "These persons may have a low basal metabolic rate without myxedema." He, however, does not suggest thyroid therapy and further states that "an effective schematic treatment for vertigo cannot be expected."

It would seem then, from the symptoms and the clinical findings that hypothyroidism and the symptom complex described as Ménière's disease are very close together and may be related. Some well-known facts about thyroid deficiency would tend to further emphasize this possible relationship. Hydrops of the labyrinth is now accepted as the characteristic pathological finding in Ménière's disease. This indicates a disturbance in the water balance in the body resulting in water retention in the endolymphatic spaces. No one has thus far offered a satisfactory explanation of this pathological finding. Grollman[8] states that the water balance of the body is markedly affected by the state of thyroid activity. In thyroid deficiency there is an accumulation of water in the tissues—thought to be in the intracellular spaces. The administration of thyroid causes the tissue to lose water and produces diuresis in the hypothyroid individual. Furthermore, the administration of thyroid or thyroxine causes an increase in cardiac output with generalized increase in blood flow through the capillaries. Conversely, decrease in thyroid activity produces a decrease in blood output by the heart. In prolonged hypothyroidism there may be permanent impairment of the heart action due to damage to the heart muscle.

Mygind and Dederding[13] in a paper entitled "Studies on Some Cutaneous and Subcutaneous Phenomena and their Relation to the Labyrinthine Alterations in Mb. Mènièri" in 1929 called attention to the frequent occurrence of subcutaneous fatty deposits in this disease. This corresponds to the isolated fat deposits characteristic of myxedema. These investigators stated their belief that the ear phenomena in Ménière's disease depends upon an abnormal deposition of water in the internal ear due to deficiency in capillary function.

Horton[11] considers the most likely etiological factor in Ménière's disease to be "Local alteration in capillary permeability resulting in local edema." Horton has obtained immediate relief in cases suffering with severe vertigo with the intravenous administration of histamine and his patients are apparently kept free of attacks by small maintenance doses.

Atkinson[1] makes use of histamine in a different manner. He believes that the etiology of Ménière's disease is a vasomotor disturbance: in some patients due to vasodilatation and in others due to vasoconstriction. Those in the former group, he believes are allergic to histamine. They are determined by positive skin reactions to histamine and are treated by desensitizing the patients to histamine. The majority of his patients are relieved. The vasoconstrictor group he treats with nicotinic acid. Campbell[4] claimed good results in nine of eleven patients treated according to Atkinson. Cawthorne and Hallpike[5] and Rainey[15] have obtained good results with histamine, intravenously. It is not known how the injection of histamine intravenously acts to control vertigo. The action of histamine on the capillaries is to dilate and increase permeability and thus contribute to water retention. Schick[17] claimed relief in a small series of cases with intravenous injection of magnesium sulfate. This was used because of its diuretic effect and also as a depressant to the central nervous system. Brunner[3] recommended the use of iodine and calcium but offered no rationale for this form of treatment. If hypothyroidism is the basis for the vertigo, iodine is, of course, logical therapy.

Probably the treatment most widely accepted in Ménière's disease is that directed toward restoring the body water balance to normal. In 1934, Furstenberg, Lashmet and Lathrop[7] showed, in a carefully controlled experiment, that general body water retention alone does not induce an attack of vertigo in a patient with Ménière's disease. Attacks could, however, be produced at will by administering sodium salts, even in a state of dehydration. Ammonium chloride was found to effect the loss of stored water but failed to produce attacks of vertigo while supplying the chloride needs of the body. These authors, therefore, theorized that the relief of the symptoms in Ménière's disease is due more to the loss of sodium salts than to water alone. The Furstenberg replacement treatment is based on this work. Salt is excluded from the diet and ammonium chloride administered by mouth.

Vertigo can be relieved by several surgical procedures. Years ago in England, Woodman[20] is said to have obtained relief in a number of cases by stripping up the dura and rupturing the ductus endolymphaticus. Dandy[6] advocates section of the vestibular nerve in severe cases. This operation undoubtedly cures aural vertigo but the tinnitus remains. Wright[21] advocated alcohol injections through the oval window to cure aural vertigo. He claimed to have satisfactorily treated fifteen cases by this method. Cawthorne, Good-

year, and Day have successfully treated vertigo by uncovering the semicircular canals.

In the series of thirty cases here presented, twenty-five received thyroid therapy. All these were relieved of their vertigo and most other symptoms on adequate dosage to bring the metabolic rate up to near normal and hold it there. These patients experience such a feeling of well being in addition to relief from the attacks of vertigo that most have co-operated well in the treatment.

Because thyroid hormone is cumulative in the body, only a small daily dose is required. This will, however, vary with the individual and the metabolic rate. According to Grollman, a single dose reaches its maximum effect on about the seventh to tenth day. Assuming this to be the tenth day, it has been calculated that a daily dose of one grain of desiccated thyroid reaches its maximum effect on the nineteenth day when it would be equivalent to 5.5 grains. Grollman further states that 1 mgm. of thyroxine intravenously (equivalent to 1 gm. of desiccated thyroid) increases the basal metabolic rate of normal individuals about 2.8 per cent. But hypothyroid individuals are more sensitive to thyroid than are the normal and respond to smaller amounts of the hormone.

The precipitating cause of an attack of vertigo is thought, by some of those who hold to the vasospastic theory, to be due to sudden vascular dilatation, with an inrush of blood, following a spasm of the labryinthine vessels. Hallpike has suggested that, with the endolymphatic spaces dilated practically to the limit of their bony shell, any slight further increase in the fluid content would set up an irritation resulting in vertigo. This theory presupposes an advanced pathological condition in the labyrinth while vertigo is, in fact, one of the earliest symptoms in Mèniére's syndrome. Lack of evidence of auditory damage in the early stages does not support the assumption that such extreme dilatation exists from the beginning.

With decreased output of blood by the heart and sluggish flow from low blood pressure and low metabolism in hypothyroid states, there is decreased oxygen supply to the tissues. It has also been shown that after removal of the thyroid gland, other body organs show a decrease in oxygen consumption. There is an accumulation of lactic acid in the blood. A state of anoxia exists in the tissues. These facts suggest the possibility of attacks of vertigo being precipitated by the accumulation of waste metabolic products in the endolymph. A surprising number of patients experience their vertigo at night, or on arising in the morning when the blood pressure and doubtless the metabolism are at low ebb.

Summary

Thirty patients, characterized by recurring attacks of vertigo, fatigue, low basal metabolism and low blood pressure are presented. Desiccated thyroid gland generally gave relief from symptoms in twenty-five patients who were treated. Some points of similarity between this symptom complex and Ménière's syndrome are noted. The possibility of attacks of vertigo being precipitated by the accumulation of waste metabolic products in the endolymph is suggested. Routine basal metabolic studies and blood cholesterol determinations should be made in patients with Ménière's symptom complex.

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THE EVALUATION AND MANAGEMENT OF RECURRENT HEADACHES

CAPTAIN JOHN A. AITA, MC, AUS
Galesburg, Illinois

IT is not within the scope of this paper to parade each type of headache and discuss it diagnostically and therapeutically. Certain few headaches, such as classical migraine and histaminic cephalalgia are distinctive. A great number of headaches, however, do not show such repetitious, clear-cut pathognomonic features. These require a broader approach and more thorough investigation. It is with the approach to the problem of non-classical, non-distinctive, recurrent headaches that we wish to concern ourselves.

The complaint of headache is one of the commonest in the practice of medicine. In the neurologist's office, it is a daily problem. Seeing these patients day after day, we have developed certain lines of attack and concepts concerning the questions:

1. Why does he have this pain?
2. What can be done about it?

Physiology

The fundamentals and physiology of pains in and around the head are of interest. Recent work[18] indicates the following significant physiology.

It has been demonstrated that the cranial and intracranial arteries, the great venous sinuses and their tributaries from the surface of the brain are sensitive to pain.

Likewise, other structures supplied by the fifth, ninth, and tenth cranial nerves and the first three cervical nerves are sensitive to pain. Most of everything else intracranially, including the brain itself, the dura, the arachnoid membrane, and even the choroid plexus are not sensitive to pain.

Certain basic mechanisms of headache production from intracranial sources have been demonstrated: (1) traction on the veins or arteries mentioned; (2) distention or dilatation of these vessels; (3) irritation or inflammation in any of the other structures supplied by the cranial and cervical nerves mentioned; (4) direct pressure by space-occupying lesions on these nerves.

Pathways for pain for structures above the tentorium, are contained in the fifth cranial nerve. Pathways for pain concerned with structures in the posterior fossa are concerned with the ninth and tenth cranial nerves and the upper three cervical nerves.

Stimulation around the circle of Willis or the large cerebral arteries near it causes pain in, over, and behind the eye on that side. Stimulation of the vertebral or basilar artery, or their nearby branches, causes pain in the occipital or nuchal area.

The above mechanisms are only integrated parts of a complex nervous physiology in the head and neck which involves smooth and striated muscles, vascular tone, secretory activity and uncharted pathways for pain.

The Patient's Story: History Taking

The patient with headaches usually has a wealth of diagnostic information to give, if his physician has the time and patience to obtain it. No headache is ever covered in three or four sentences. It invariably boils down that certain fundamental information is desirable before the "history" is complete. Whenever possible, the patient is permitted to do the talking. From time to time, questions may be supplied. How the patient tells his story and how well he has observed his complaint are important to note. Rather than an immediate plunge into "Tell me about your headache," it is best to assume a more general approach. The following questions are not leading and should open the history taking:

1. How long has it been since you have been in 100 per cent good health?
2. You were going along, feeling fine, then what was the *first* thing that happened?
3. What are the *main things* bothering you *now?* (What symptoms, weakness, hurting or things not working right?)

To ensure complete coverage, a record sheet may be valuable (Fig. 1). It may serve as a permanent record or to assist in dictating a more formal note. As mentioned, there are a

number of things to learn about a headache. A great many facets characterize headaches and bear careful inquiry:

1. Has he ever had previous bouts of headaches seemingly unrelated to present complaint?
2. Possible etiological factors. Where was he and what had he been doing when they were first noted? What does patient blame onset on? What preceded it or ushered it in? Did it follow pneumonia, flu, a head injury (even minor), heavy lifting, earache, an emotional upset?
3. Exact location of present complaint. Radiation?
4. Any *other* type of head pain or ache? Don't overlook fact that patient may have *more* than one kind of headache.
5. Quality of distress: dull, ache, throb, sharp, jab, bruised feeling, cramp, electric shock, tightness, pulling, viselike, sore scalp, hang-over feeling, tired feeling, et cetera.
6. Severity: A headache may be considered just annoying, actually bothersome, debilitating or excruciating. How much does it distract or disable? How much effort required to continue with it? How much time is lost from work, pleasures? How much does it impair efficiency, sleep or emotional state? Have desirable plans or modes of living had to be changed? How much doctoring and sick call? How often are remedies necessary? Do they help? Are codeine or heavy sedation ever necessary?
7. Course to date: Was onset gradual and insidious or sudden and somewhat dramatic? What changes have taken place as time goes on? Have intensity, frequency, duration, location or type of pain changed?
8. Frequency and duration of attacks *now*.
9. Pattern of a typical attack: aura, onset, build-up, peak, plateau, attenuation, hangover.
10. Diurnal pattern: Characteristic time of onset? When is usually best or worst time of the twenty-four hours?
11. Associated symptoms: (are these quite distressing in themselves?) nausea, anorexia, urinary frequency, sweating, red eyes, syncope, dizziness, photophobia, visual changes, tears, nose run, tinnitus, paresthesias, nervousness, depression, ataxia, flushing, neck rigidity.
12. What conditions precipitate or aggravate a headache? Are they stressed as important factors in frequency, severity or duration of attacks? Sudden increase of intracranial pressure (coughing, sneezing), certain types of activity, motions of cervical spine, vestibular stimulation, sudden change of position, nervousness, emotional states, alcohol, food sensitivity, missing a meal, heat, eyestrain, dust, damp weather, et cetera.
13. Relief: medication, tilt head a certain way, spinal tap, alcohol, local pressure, position of comfort, coca cola, coffee, hot or cold shower, sleep, emesis, local applications, laxatives, nose drops, bed-rest.

Leading or suggestive questions to patients must be avoided. We may practically "give it away" to a patient that certain characteristics are necessary if this is going to be a good story. I am sure that some "good" migraine histories are inadverently "made" by leading and innocently repetitious questions.

Headache Sheet

1. Previous headaches
2. Possible etiological factors
3. Exact location
4. Other types
5. Quality

6. Severity
7. Course, changes
8. Frequency and duration attacks **now**
9. Pattern of each attack
10. Diurnal pattern
11. Associated symptoms
12. Precipitated or aggravated by

13. Relief

Fig. 1. Type of record sheet used in history taking.

A detailed account of the headaches is valuable for three reasons:

1. It provides a valuable number of clues which narrow the diagnostic possibilities down to a few or several.
2. For future comparison, it gives an accurate means of checking the consistency of the patient's story. This may be a valuable point in diagnosis.
3. With passage of time it permits an objective evaluation of progression or attenuation.

Who Is the Patient?

As history taking proceeds, it is often valuable to inquire: Who is the person who has these headaches? Does his own vegetative nervous system or personality contribute in any way to these headaches? How does he take them?

Disability Rating

It is usually necessary to evaluate how disabled the patient actually *is* and how disabled he *says* he is. How much is he actually disabled from the standpoint of: (1) actual severity of the attack; (2) duration of the attack; (3) frequency of the attacks.

Precipitating and Aggravating Factors

It is important to pay careful attention to conditions which tend to: (1) precipitate a headache; (2) aggravate a headache once it is present.

These conditions often give diagnostic clues

They may bring out conditions for the patient to avoid in the interest of less difficulty.

Precipitating and aggravating factors are of two types, readily understandable and not readily understandable, physiologically. The supposedly understandable ones are like coughing with brain tumor headaches, a stopped up nose with sinus headaches, reading small print with ocular headaches. The more empiric conditions concern posture, time of the day, alcohol intake and so on. For instance, it is not readily explainable why the hypertensive cannot stand a warm room or the concussion case cannot stand train rides.

We have endeavored to carefully explore precipitating and aggravating factors among headache types frequently found among soldiers at this hospital. The usual history taking, question and answer method proves tedious when one tries to cover all conditions related to exercise, varying intracranial pressure, jarring, cervical spine, emotions, position, sudden motion or change of position, alcohol, photophobia, eyes, hypoglycemia, foods, fever, extreme temperature, nose and sinuses, vestibular stimuli and certain other conditions patients often mention (such as constipation or odors). We have found it expedient to cover all of these questions by placing them as simple statements of conditions on about 100 cards (e.g., "A truck ride over rough roads," "Cold weather," "Bending forward exercises," "If I suddenly go flop on the bed"). The patient then picks out the most important precipitating and aggravating conditions.

Etiology

The ideal hoped for is to find exactly what is causing a given complaint. The problem of headache, perhaps more than any other local pain problem, leaves the physician disappointed who frequently expects to find some simple, extricable or counteractable explanation.

Knowing the diagnostic possibilities, clues are found in the careful history, examinations, laboratory aids and some knowledge of the individual physiology at hand. We have found the following etiological considerations practical as diagnostic work-up proceeds with recurrent headaches:

1. Intracranial pathology
   - (a) Inflammatory (includes syphilis): abscess, diffuse encephalitis, granuloma, meningitis.
   - (b) Neoplastic (primary, metastatic).
   - (c) Traumatic or physical agents, "concussion," subdural hematoma, "sunstroke," subdural hydroma, meningeal scars.
   - (d) Vascular (including extracranial vessels) aneurism, arteritis, phlebitis, thrombosis, hemorrhage.
   - (e) Those associated with (usually following) convulsive disorders.

2. Neuralgia and neuritis (V, IX, X cranial, cervical II, III)
   Occipital nerve neuralgia.
   Supraorbital neuralgia (also tic doloreaux).
   Sluder's neuralgia.

3. Muscles of scalp and neck
   Emotional tension ("muscle hypertension"), spasm secondary to pain elsewhere, Myositis, Fibrositis.

4. Disease of skull (cranial bones)
   Osteomyelitis, blood dyscrasia (marrow)

5. Ear, nose, throat (includes sinuses, petrositis, et cetera).

6. Dental and temporomandibular joint.

7. Ocular
   Hyperopia, Astigmatism, Anomalies of accommodation, Glaucoma, Muscle imbalance, Iritis.

8. Cervical spine and intraspinal canal (above C4)
   Arthritis, Primary bone disease, Anomalies, Chronic inflammatory, Neoplasm, Fracture, Dislocation.

9. Exogenous toxins (metals, gases, sprays, fumes, dusts, liquids, medications).

10. General systemic disease.
    Hypertension, Polycythemia, Chronic Febrile, Infectious States, Allergy (including histamine sensitivity), Endocrine Imbalance.

11. Psychosomatic. An important link in the causation and progression of many headaches lies in the emotional-vegatative physiology of the individual. This is true in other diseases, such as duodenal ulcer and hypertension. This group of patients is not necessarily neurotic in the common use of the term. Many "migraines" belong here.

12. Psychoneurotic. Neurotic and immature personality features, hampering conflicts and maladjustment are readily noted in this group. These characteristics assist in the vicious cycle to cause more tension and discomfort. Examples of headache patients often found include:
    - Those with dramatic, embellished, hard-to-believe types of headaches.
    - The chronic invalid: "never strong."
    - The hypochrondriacal: introspective, harping, overevaluates minor distress.
    - The inadequate (headache proves a valuable excuse for poor school, occupation or Army record).
    - The chronically anxious, worrisome, apprehensive.

13. Attitudinal: Administrative problems, seen particularly in prison or military service, compensation and litigation cases.
    - Malingering (psychopath)
    - Quick excuse (benign, spur of moment)
    - Fairly conscious exaggeration of mild symptoms ("Riding it," "bucking.")

Most Severe Headaches

The most severe, excruciating types of headaches are due to: (1) migraine; (2) rupture of intracranial aneurism; (3) acute, severe meningitis; (4) major, acute infectious disease (typhoid, dengue, et cetera); (5) psychoneurosis.

How Much Fuctional and How Much Organic?

Again, etiological implications are important and complex. Perhaps even more than in abdominal distress, the individual with headaches is interposed in the reflex arc giving rise to distress. The diagnosis is often more understandable if "functional versus organic" delineations are dropped. Instead, we strive to evaluate how much of the origin of this headache lies in the personality or emotional physiology of this individual and how much lies in some less reversible cytoplasmic changes. History and findings plus some knowledge of the individual involved will throw the balance one way or another. We have found the following diagnostic clues helpful:

Organic

Onset preceded or ushered in by conditions with etiological implications, such as otitis media, pulmonary infection, head trauma, et cetera.
Good health to a certain, reasonably recent time.
Headaches are of relatively recent origin (even up to a few years). May be insidious in appearance.
If he had headaches many years, there was a recent *change* in location or character of distress. Increase in intensity, frequency or duration may be significant if definite.
Progression or at least a note of it over a period of time (even if remissions occur).
A reasonably good observer and informant.
Minimal exaggeration.
Admits good days, relief.
Debility resulting from distress is understandable.
Tolerates discomforts like an adult.
Does not overevaluate health.
Has some perseverance, responsibility, goals.
No complicating attitudes.
Does not abuse alcohol.
Minimal use of emergency analgesics, barbiturates, bromides.
Minimal indications of chronic state of emotion.
Story is reasonably consistent when checked again at various times.
Other signs or symptoms of organic nature present: namely, visual loss, skull films, sinusitis, et cetera.
Conditions which precipitate and aggravate headaches are chiefly those related to organic pathology.
Character of distress. Ache, pain, hurting. No great amount of descriptive gymnastics necessary.
Methods by which relief is obtained. Following spinal puncture; sudden changes of position; tilting head; dehydration (by purging or emesis).
Absence of or minimal litigation and compensation problems.

Functional

Onset preceded or ushered in by emotional situations or is vague.
Recurrent or chronic poor health for many years. Recurrent ill-defined ailments. Vague story about health.
Headaches are long-standing (especially if more than five years).
No change. "Spittin' image" of headache he has had many years. Changes in intensity, et cetera, not convincing or are related to situational stress.
Not progressive.
Patient is a vague or annoyed informant. Is not as good an informant as he is a complainer.
Dramatic, hard-to-believe or embellished tale. (Has he read a text book about head pains?) Gets along too well for the excruciating distress complained of.
Constant, continuous distress. "Nothing helps."
Invalidism, more than facts account for.
Low distress tolerance. Gives up easily.
Self-concern, introspection. Insufficient interest in what he can do despite his complaints.
Inadequacy: poor work record.
Attitudes: chip on shoulder, "fed up," "wise guy."
Alcohol abused.
Recurrent use or reliance on codeine or morphine. Excessive use of barbiturates, bromides.
Chronic, undissipated emotional states and physiological concomitants; palpitation, anorexia, insomnia, compulsiveness, et cetera.
Inconsistencies in story, too many changes. Evidences of suggestibility.
Objective findings are few or not convincing. (Findings at hand explain patients' distress only with difficulty and may well be unrelated and coincidental, e.g., chronic prostatitis).
Precipitating and aggravating factors are vague, nondescript. Patient reveals suggestibility when questioned about them. Emotional factors loom large. May make a flat denial that anything aggravates or precipitates.
Vague, ill-defined *distress* or not actually a *headache* or *pain*.
"Tired feeling" in head, dizzy-like, foggy or logy feeling; hang-over; sore scalp; viselike, pressure, heavy or tight band feelings. "Drawing" sensations, expanding or "pushing out" feelings. Bizarre descriptions.
Relief: usually none whatsoever. "Old time" remedies such as vinegar compresses, "liver pills"; faith cures, chiropractic; use of alcohol.
Litigation and compensation problems.

Management

Management of recurrent headaches may include the following approaches: (1) etiological, (2) analgesic, (3) pharmacological, (4) physiotherapeutic, (5) blaming heredity, (6) psychosomatic.

Etiological.—Remove the cause. It has been indicated, however, that the etiology of recurrent head pains is complex. We are often confronted not with a single etiology. At times it appears that a single etiological condition sets off several others. For instance, it is not uncommon to unravel a sinusitis, then to find scalp and neck muscle spasm or a cranial nerve neuralgia which carry on.

There is no reason why a patient with migraine cannot develop a brain tumor. A hyper-

tensive may also have a maxillary sinusitis. A patient with a chronic subdural hematoma may be a psychoneurotic of long standing. Organic conditions and emotional states do not exclude one another. They may co-exist or wax symbiotically.

If a singular approach does not bring results it is well to be broadminded. Missing pieces of the jigsaw puzzle must be sought. To treat sinuses or emotions or allergies week after week with only equivocal results is indication enough that a different approach is needed.

Analgesic.—Aspirin, phenacetin and similar mild, non-narcotic analgesics have a place in tiding the patient over rough spots. These may be combined synergistically with one of the rapidly acting barbiturates (e.g., nembutal grains ½ to 1½) or bromides. Frequent use of any analgesic is not without dangers.

The use of codeine, morphine, dilaudid and other analgesics of this class is to be avoided excepting as emergency measures in very severe headaches. It is the rare headache that requires such medication. The chance for addiction to develop among headache patients is very real and particularly dangerous in migraine and functional types.

Another method of analgesia concerns injections of novacaine into nerves (e.g., great occipital nerve, supra-orbital nerve) or merely infiltrating the painful area.

Pharmacological.—With the knowledge of what ergotamine and histamine may do to the vascular tree, investigators have sought other chemicals which may brake the underlying pain-producing mechanisms. It must be admitted that many of these drugs are given empirically. They may be given orally or parenterally, at the very onset of a headache or as a daily routine to note effects on the recurrent pattern.

The following are some of the drugs used. They are usually given in smaller doses and gradually increased to test their full effects. At times they are increased almost to point of tolerance. Some are gradually increased with the idea of "desensitization" to some unknown noxious physiological occurrences. Histamine and prostigmine are examples.

Ergotamine tartrate ("Gynergen"): 1 mg. tablet sublingually; 0.5-1.0 mg. subcutaneously.[16]

Prostigmine hydrobromide: 15 mg. tablets by mouth; 1 mg. subcutaneously.[11,13]

Benzedrine sulphate: 5-15 mg. doses by mouth; 2.5-10 mg. subcutaneously.[8]

Atropine sulphate: 0.45-.09 mg. (grains (1/150-1/75) by mouth or subcutaneously.

Dilantin (diphenylhydantoin, sodium): 0.1 gram by mouth three or four times daily, before meals. (May be worth a trial if the electro-encephalographic tracing is very abnormal or if the headaches have an episodic, paroxysmal character.)

Ephedrine sulfate: 15-50 mg. by mouth 10-25 mg. subcutaneously.

Nicotinic acid: 25-100 mg. by mouth; 10-50 mg. subcutaneously.[3,7,17]

Histamine: desensitization program, beginning with 0.03 mg. subcutaneously and gradually increasing dose to 0.1 or more mg. over a 10-20 day period. Histamine has also been given intravenously, 1.0 mg. in 250 c.c. of saline, at a slow rate, repeated several times a week.[3,4,5,9]

Caffeine: .5-1.0 gram of caffeine citrate by mouth; .5-1.0 gram of caffeine sodium benzoate subcutaneously or even intravenously.

Aminophyllin: .25-.50 grams subcutaneously or intravenously.

Thiocyanates: .3 grams per day of sodium or potassium salt by mouth. After the third day, reduce dose to maintain blood serum level of 8-12 mg. per cent thiocyanate.[10]

Electrolytes: large intake (by mouth) of calcium lactate (3 parts) and potassium chloride (1 part). It is possible that the parenteral route of administering Ca and K ions could be used also.[14]

Oxygen inhalation: medicinal oxygen is inhaled with a mask at the very onset of an attack.[1] It should be continued for thirty to sixty minutes, or longer.

The above drugs are sometimes combined with analgesics or barbiturates. The dangers of shot-gun preparations and unscientific homeopathy are evident. It is often impossible to evaluate the role of the physician's conviction and patient's suggestibility when a "potent" drug is administered. This somewhat

blind pharmacological approach often ultimately aggravates functional headaches because:

1. It avoids getting down to fundamental causes and needs for adult adjustments.

2. It "fixes" any psychoneurosis by calling repeated attention to it and treating it as if it were "organic."

3. It may entail hospitalization, hence encourage invalidism.

Physiotherapeutic.—This is of particular value in headaches of scalp and neck muscle origin. It should be kept as simple, homemade and undramatic as possible: heat, simple massage, a warm shower or sitting in a tub full of comfortably warm water for half to one hour.

Other Methods.—Dehydration to a moderate degree may be tried. Limiting fluid to 1000-1200 c.c. daily should suffice. In addition, mild diuretics and saline purges may be used.

Morning headaches may be relieved by elevating the head of the bed 18 to 24 inches on blocks.[2]

The endocrines are also tried but again this approach sometimes appears quite empiric despite various attempts at explanation.[6] Even modified insulin "shock" therapy has been used in an attempt to revise the autonomic mechanisms at fault.[15] There is no harm in small doses of thyroid, testosterone, or estrogenic substance provided the pitfalls outlined under the pharmacological approach are thoroughly appreciated.

Hereditary.—Heredity is too often invoked and formulated to the patient as a "cause" for his distress. If the mother or an uncle had headaches, then the condition is often pounced upon as hereditary. It is an impractical straw at which to clutch and is often the essence of poor mental hygiene:

1. The patient is impressed by heredity as an overwhelming fate. He may well inherit all the liabilities of the family tree then. Resignation, hopelessness and excuse making do not lead to any betterment.

2. It avoids getting down to fundamental causes particularly if the headache is of emotional or psychoneurotic origin.

3. There is the ready interpretation that children will have this condition. The fear and expectation may aid the development of such pattern of complaining or expressing emotions. Such family patterns are as commonly perpetuated as are family tastes and traditions.

Psychosomatic.—Many headaches are physiologically bound to the patient's vegetative nervous system, emotions and personality. This does not necessarily mean that they are "neurotic." Chronic states of emotion have a great deal to do with smooth and striated muscle tonus, vascular tonus and secretory activity throughout the head and neck.

Some people express grief, anger and so on differently and are not necessarily neurotic. Emotional changes may overflow into certain vegatative circuits and be manifest in disguise because the sensations then appear referable to a certain organ or system. Many patients can describe how unwept tears of sadness or anger cause pain around the eyes, temples or maxillary region.

The management of headaches often calls for a knowledge of "the physiology of people." It is often as important to evaluate a mother-in-law at home as it is to ponder over some cervical arthritis. It may be as important to know that a patient is unusually sensitive or perfectionistic or full of medical misconception as it is to know that he has a slight hypertension.

As with a great number of other conditions in medicine, it is as important to know the host and his reactions as it is his disease. We cannot be limited to inquiry concerning: What is the headache that this patient has? We must know: Who is the patient who has the headache? What is *his tolerance* to emotional strain? What is *his reaction* to it? Generalizations are of no help. All heart conditions are not myocarditis. All non-organic headaches are not migraine or psychoneurosis.

These are cases wherein a patient must be surveyed not as an isolated cerebral-vascular preparation, but rather as a *whole* and individual physiology. Muncie[12] put it well when he reminded us that man is not a mere sum total of organs and systems, but is an integrate, not fully understandable or predictable from the anatomical and physiological data of the

parts as such. Many physiological processes are long circuited by means of delayed reflexes through a wealth of experience and associated material of the individual. The patient himself is often interposed in the many reflex arcs which govern a great deal of his physiology. The origin of many headaches then is based on a highly individual physiology and pathology.

Summary

Cranial and intracranial arteries, the venous sinuses and their tributaries from the surface of the brain are sensitive to pain. Other structures supplied by the fifth, ninth and tenth cranial nerves and the first three cervical nerves are also pain sensitive.

The average headache has many facets which bear exploration. A carefully taken history often tells much about the diagnosis. It likewise gives an accurate method of checking the patient's consistency or significant developments which aid in diagnosis.

We have outlined etiologies. We are fortunate when we find a headache due to one extricable or counteractable cause.

The etiology of many headaches is complex. The individual concerned is interposed in the reflex arcs and pathology which give rise to distress. For this reason, careful history taking, observation and knowledge of the person who has the headache are important. This is not meant to imply that many headaches are "neurotic." Rather they are highly individual physiologic and pathologic reactions closely associated with the emotional and vegetative systems of the individual.

The specialist who believes that in his field only lies every healing virtue will relieve many headaches only by accident, by the help of time (the great healer) or by psychotherapeutic strokes which he himself does not recognize. Management therefore calls for broad etiological considerations and judicious use of analgesics and pharmacological mechanisms.

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STUDIES BY ARMY TAKE "Q" FEVER OUT OF MEDICAL CURIOSITY CLASS

"Q" fever, a pneumonia-like disease first described from Australia, apparently is endemic around the Mediterranean area. Scattered outbreaks have been reported among American troops in Italy, Greece and Corsica.

Study of these outbreaks by medical officers on the spot at an Army General Medical Laboratory, and by the Commission on Acute Respiratory Diseases of the Surgeon General's Office have thrown considerable light on this supposedly rare illness and established that it is (essentially) identical with the so-called Balkan Grippe which was epidemic in Greece in 1942.

The responsible agent has been identified as a very minute, red-shaped organism belonging to the family of rickettsia, similar to the organism which causes typhus fever. It has been impossible to establish the means of transmission, except that evidence suggests that the "germ" apparently is inhaled in infected dust.

In laboratory outbreaks the disease appears to be extremely infectious. Accidental infections have occurred in almost every laboratory where experimental work with this rickettsia has been conducted. It is likely to be confused with atypical pneumonia, of which the causative agent has not been identified. The syndromes of the two are somewhat similar.

A significant finding was that "fever rickettsia becomes much more virulent with successive passages through the blood of experimental animals." The malady comes suddenly with chills, sweats, aching muscles and frontal headache. The victim usually is incapacitated for two weeks or more.

Until recently the disease had been considered a medical curiosity.

BLOOD DYSCRASIA WITH AND WITHOUT ASSOCIATED "ATYPICAL LICHEN PLANUS"

Report of Four Cases

MAJOR D. R. GILLESPIE* and LIEUTENANT COLONEL PHILIP W. BROWN†
Medical Corps, Army of the United States

THE term "atypical lichen planus" has been introduced to indicate a kind of dermatosis encountered among military personnel in the Southwestern Pacific area. In a few of these cases, there have occurred instances of a severe blood dyscrasia; similar hematologic changes have been encountered among patients who did not have the lesions of the skin. The chief features of this form of blood dyscrasia are progressive granulocytopenia, thrombocytopenia and, finally, anemia.

We wish to report four cases of this type of blood dyscrasia. In two cases the hematologic changes were accompanied by the cutaneous lesions of atypical lichen planus; in the other two cases they were not.

In the period May 20, 1944, until January 20, 1945, there had been admitted to our service 107 patients who had atypical lichen planus. Two patients of this group had associated hematologic changes. We have knowledge of four other patients whose condition was similar; no doubt other patients with this condition have been encountered in this particular theater. During the same period, two patients who presented a similar blood picture, but who did not have the cutaneous lesions, were seen.

Report of Cases

Case 1.—A chaplain of a local Air Forces unit, thirty-three years old, was first seen in the outpatient dermatologic clinic of an Army hospital on May 28, 1944. He complained of severe itching of the scrotum. He stated that this itching had persisted for about a month and that gradually it had become worse. On examination, moderate redness of the scrotum was found, with excoriation that had resulted from rubbing and scratching. The patient's skin otherwise was clear. He was advised to use calamine lotion with 0.5 per cent phenol, which was to be applied several times daily. He was cautioned to refrain from scratching.

On June 20, 1944, this patient again reported to the dermatologic clinic because of persistence of the itching of the scrotum, excessive dandruff and itching of the scalp. On examination, the scrotum of the patient appeared to be excoriated, as it had previously; but several small areas of weeping also were seen. Dandruff was excessive and small, crusted lesions were present throughout the scalp. The skin otherwise was normal. The patient stated that in other respects he felt well. He was instructed to shampoo the scalp daily, and was given a prescription for a scalp lotion and an antipruritic dusting powder to use on the scrotum.

This officer was not seen again until October 21, 1944, when he was admitted to the hospital in question because of weakness, dyspnea and fatigue. He stated that he had been in New Guinea since October 30, 1943. He had taken regularly, each day, the suppressive dose of 0.1 gm. of atabrine since October 24, 1943. He had been eating the usual army rations, had experienced no loss of weight and had felt himself in good health until his present condition came about. He said that in July, 1944, he had noticed a pigmented eruption on the upper eyelids. This eruption gradually had become more noticeable. Within a week or two after the appearance of the lesions on the eyelids, he had noticed a similar eruption on the ears and around the lower portion of the neck. He also had noticed, during the following few weeks, an eruption on the shoulders and over the back and chest. Late in August, 1944, a patch of weeping dermatitis had developed on the dorsum of the left foot; this dermatitis gradually became larger. The skin of the scrotum had continued to itch and had become weeping and crusted. The scalp had continued to itch excessively and the dandruff persisted.

The patient said that in the middle of September, 1944, about two months after the appearance of the eruption on the eyelids, he had begun to notice that he tired easily, lacked his usual physical strength and that dyspnea and fatigue would develop on slight exertion. These symptoms gradually became more severe, and he therefore sought medical attention.

On physical examination, this officer appeared to be very pale and enervated. He was otherwise well developed and well nourished. Dusky red to violaceous scaly plaques were present on the upper lids of both eyes. Violaceous scaly papules were present on both ears. Numerous small crusted lesions were scattered throughout the scalp; excessive scaliness and dandruff were present. Several violaceous, scaly, papular lesions about 5 mm. in diameter were present around the sides of the neck. Numerous dusky red, scaly, round to oval, macular patches 1 to 4 cm. in diameter were scattered sparsely over the shoulders, back and chest. Some of these lesions exhibited definite follicular hyperkeratosis, resembling goose flesh. The scrotum was very red, markedly eczematous and crusted. A large, dusky red exudative circinate patch of dermatitis about 5 cm. in diameter was situated over the dorsum of the left foot.

*Dr. Gillespie has been released from the medical corps of the armed forces and is now at the Earl Clinic, Saint Paul, Minnesota.

†Dr. Brown has been released from the medical corps of the armed forces and has returned to the Mayo Clinic, Rochester, Minnesota, as consultant in medicine.

There were no lesions of the mucous membranes. Results of the rest of the physical examination were negative. The liver and spleen were not palpable. Lymphadenopathy was not present.

On admission of this patient the initial blood count revealed 2,500,000 erythrocytes and 2,400 leukocytes per cubic millimeter of blood. The differential count was 16 per cent neutrophils and 84 per cent lymphocytes. There was no shift to the left. The blood smear disclosed moderate anisocytosis and poikilocytosis. Very few platelets were present. Reticulocytes were not found. The color index was 1.2. The mean corpuscular volume equaled 84 cubic microns. The mean corpuscular hemoglobin equaled 32 micromicrograms. The mean corpuscular hemoglobin concentration equaled 38 per cent. The blood sedimentation rate (Wintrobe method) was a fall of 54 mm. in one hour. The hematocrit reading was 21 per cent. The clotting time was 25 seconds. The bleeding time was 1 minute 45 seconds.

The diagnosis of atypical lichen planus with granulocytopenia was made. The patient was advised to cease taking, daily, the customary tablet of atabrine.

Blood was transfused repeatedly to the patient, and liver extract was injected intramuscularly. Ascorbic acid, thiamine and multivitamin capsules were administered orally.

On October 26, 1944, five days after the patient had been admitted to the hospital, his erythrocyte count had decreased to 1,950,000 and the leukocyte count to 2,150, per cubic millimeter of blood, with a differential count of 16 per cent netrophils and 84 per cent lymphocytes. On November 1, 1944, the eleventh hospital day, the blood count revealed 2,900,000 erythrocytes and 3,100 leukocytes per cubic millimeter of blood. The differential count was 15 per cent neutrophils and 85 per cent lymphocytes.

Clinically, the patient felt much improved. He had exhibited no hemorrhagic phenomena. There was no change in the lesions of the skin. He was evacuated by air to the United States, leaving the hospital in question on November 2, 1944. By means of information coming to our attention at a later date, it was learned that this chaplain had died of blood dyscrasia about two weeks after he had reached a hospital in the United States.

Case 2.—A corporal in the Quartermaster Corps, thirty-one years old, was evacuated to the hospital in question on January 6, 1945, from a forward installation because of a severe eruption of the skin. He had arrived in New Guinea on April 7, 1944. He stated that he had been eating the usual army rations and had lost no weight. He had taken the usual suppressive dose of 0.1 gm. of atabrine daily since April 1, 1944.

This soldier stated that on about October 25, 1944, an eruption had developed on the inner aspects of the upper part of the thighs adjacent to the scrotum. This eruption had been treated as a fungous infection, but had not entirely abated. In mid-November, 1944, he had noticed an eruption on the wrists and forearms, and shortly thereafter, on the backs of the hands. During the next six weeks eruptions appeared on the face, neck, trunk and both lower extremities. In late December, 1944, about two and a half weeks before he had been admitted to this hospital, he had noticed that he tired easily, lacked his usual strength, and that dyspnea and fatigue developed on physical exertion. These symptoms had become progressively more noticeable up to the time of his admission to the hospital.

On physical examination, the pallor of the patient's skin was apparent in spite of the yellowness caused by the taking of atabrine. He was otherwise well developed and well nourished. The skin presented generalized dermatosis characterized by violaceous, smooth to scaly, papular and nodular lesions scattered over the entire body, but most pronounced on the buttocks and legs. Most of these lesions were 3 to 10 mm. in diameter, round to oval, many with their long axis tending to follow the lines of cleavage, especially around the neck and trunk. There were similar violaceous plaques on the eyelids and ears, as well as on the face. An ulcerated lesion about 1 cm. in diameter was situated on the lower lip. This lesion was covered by a bloody crust. One small ulcerated lesion was situated inside the lower lip. Results of the rest of the physical examination were essentially normal. Lymphadenopathy had not occurred, and the liver and spleen were not palpable.

Erythrocytes numbered 1,840,000. The percentage of hemoglobin was 40. Leukocytes numbered 2,450. The differential count was 32 per cent neutrophils and 68 per cent lymphocytes. Platelets were markedly decreased. Reticulocytes were not found. The bleeding time was 7 minutes, and the clotting time was 3 minutes and 30 seconds. The sedimentation rate (Wintrobe method) revealed a fall of 75 mm. in one hour. The hematocrit reading was 18 per cent. The icterus index was 7.4 per cent. Total blood proteins were 6.3 gm. Reaction of the Kahn flocculation test was negative. The blood type was 0. Thick blood smears made and examined regularly were found not to contain malarial parasites.

The diagnosis of atypical lichen planus with agranulocytopenia was made. The patient was advised to discontinue the use of atabrine immediately.

Whole blood was transfused thirteen times, in amounts of 500 c.c. at each transfusion. This was done between January 7 and February 3, 1945. The patient also received daily intramuscular injections of liver extract. Ascorbic acid, thiamine and multivitamin capsules were given orally.

On January 9, 1945, sternal puncture was done. Fluid which resembled venous blood was removed. No bone marrow cells were seen on the smear; cell counts of the fluid removed were similar to those of the blood.

The number of erythrocytes increased, but the number of leukocytes decreased during the first week of this patient's hospitalization. On January 11, 1945, five days after the patient had been admitted to the hospital, the erythrocytes numbered 3,400,000 and leukocytes, 2,000. The differential count was 8 per cent neutrophils and 92 per cent lymphocytes. Platelets were very rare. At this time bleeding began from the lesion on the lower lip and from the gums. During the next two weeks, however, the blood picture improved and the bleeding stopped. On January 15, 1945, erythrocytes numbered 3,350,000 and the hemoglobin content was 80 per cent. Leukocytes numbered 3,600. The differential count was

12 per cent neutrophils and 88 per cent lympocytes. On January 30, 1945, twenty-four days after the patient had been admitted to the hospital, erythrocytes numbered 4,500,000 and leukocytes, 3,500. The differential count was 25 per cent neutrophils and 75 per cent lymphocytes.

Clinically, the patient was much improved. There was no change in the condition of his skin. He was evacuated to the United States by air, leaving the hospital in question on February 3, 1945. Unfortunately, we were unable to obtain additional data in this case.

Case 3.—A corporal, twenty-five years old, was admitted to the hospital in question on July 13, 1944. From March 10 to June 10, 1944, he had been hospitalized because of epidemic hepatitis. He had been discharged to return to duty, and seemed well. Both prior to and after the episode of hepatitis he had received no drugs nor was he exposed to any known toxic products. Each day he had taken 0.1 gm. of atabrine for about eight months. On June 25, 1944, painful, bleeding gums and fever had developed. The patient had been admitted to his local hospital on July 3, 1944, at which time leukocytes had numbered 3,600, of which more than 90 per cent were lymphocytes. In the course of the next two weeks, the number of leukocytes had decreased to 1,800, of which 14 per cent were neutrophils and 86 per cent were lymphocytes. Few to no blood platelets had been seen on the various blood examinations. During this period blood had been transfused to the patient six times. When he was admitted to our hospital his temperature was 105° F. (40.6° C.). Many subcutaneous and mucosal hemorrhages were present. Free bleeding from the nose developed; it was controlled by packing. Later, the patient passed small black stools, the color of which was caused either by swallowed blood or by oozing from the gastro-intestinal tract. Erythrocytes numbered 2,650,000 and leukocytes, 1,000. The differential count was 1 per cent polymorphonuclear cells, 97 per cent lymphocytes, and 2 per cent monocytes. Results of other studies of the blood, including bleeding and clotting time, and fragility tests, all were normal. Sternal puncture revealed no regeneration of cells. The diagnosis of agranulocytopenia was made. The taking of atabrine was immediately discontinued. Penicillin was administered intramsucularly; whole blood was transfused repeatedly, and vitamin supplements were given; but all to no avail. The patient died on July 22, 1944, nine days after he had been admitted. During the period of hospitalization at our hospital, the patient's blood count had rapidly diminished. On July 21, 1944, the day before he died, the erythrocytes had decreased to 1,980,000, and the leukocytes to 450, per cubic millimeter of blood. The differential count was 1 per cent polymorphonuclear cells and 99 per cent lymphocytes.

Necropsy revealed no significant changes other than numerous large hemorrhagic zones in the lungs, bleeding into the renal pelvis, and a hemorrhagic region in the ascending colon. The liver was somewhat enlarged, but histopathologic study showed only acute passive congestion and cloudy swelling. Study of smears of bone marrow revealed the same information that had been obtained antemortem; namely, no evidence of cellular regeneration. There was no apparent residuum in the liver from the preceding attack of hepatitis.

Case 4.—An officer, forty-one years old, was admitted to the hospital in question on November 23, 1944. He had seemed well until the day previous to his admission, when he had noticed weakness and minute subcutaneous hemorrhages distributed over the tibia and in the mucous membrane of the mouth. He had suffered no recent illnesses and had taken no medication other than the daily tablet of 0.1 gm. of atabrine for the preceding six months. At the time of his admittance, erythrocytes numbered 3,200,000 and leukocytes, 2,400, per cubic millimeter of blood. The differential count was 3 per cent polymorphonuclear cells and 97 per cent lymphocytes. The hemoglobin, as estimated by the Sahli method, was 70 per cent. The erythrocytes were normocytic. The clotting time and bleeding time were normal. The diagnosis of agranulocytopenia was made and the taking of atabrine was discontinued. In spite of the fact that blood was transfused almost daily, and liver extract and vitamin supplements were administered, the leukocyte count decreased. On the day prior to the patient's death, erythrocytes numbered 2,630,000 per cubic millimeter of blood, with a hemoglobin content of 60 per cent. Leukocytes numbered 400 per cubic millimeter of blood, with a differential count of 5 per cent polymorphonuclear cells and 95 per cent lymphocytes. Platelets were not found. Petechiae had appeared in various places over the body and in the mouth. The patient gradually lapsed into coma and died on December 2, 1944, nine days after he had been admitted.

Necropsy revealed multiple hemorrhages throughout all the organs. Studies of bone marrow showed a moderate increase in the percentage of adult erythrocytes and normoblasts. A few myelocytes and an occasional megaloblast were found. A significant number of bizarre-shaped nuclei and multinucleated cells were observed.

Summary and Conclusions

Four cases of severe blood dyscrasia, characterized by agranulocytopenia, thrombocytopenia and anemia, have been reported. In Cases 1 and 2 there were present, in addition to the hematologic changes, lesions of the skin characteristic of atypical lichen planus. The patient in Case 1 had rather mild involvement of the skin, whereas the patient in Case 2 had extensive changes in the skin. There was no change in the dermatosis during hospitalization of the patients. The blood picture in both cases showed practically the same changes; namely, progressive granulocytopenia and thrombocytopenia with anemia.

The patients in Cases 3 and 4 presented the same hematologic changes, but did not have le-

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CALYCEAL DIVERTICULUM

E. R. STERNER, M.D., HAROLD O. PETERSON, M.D. and KANO IKEDA, M.D.
Saint Paul, Minnesota

DR. HAROLD PETERSON: Calyceal diverticulum is a subject about which very little is known. It has been described by a urologist by the name of Prather[1], and he has given a good description of three cases involving operation and has obtained histological evidence which pretty well proves the diagnosis. In the cases that we are presenting, we have no microscopic sections, but we have roentgenograms which are identical with those that Prather had, and that is why we are showing them. We hope that in the future we shall find out at operation whether or not our diagnoses are correct. For a number of years I have been interpreting this condition as a cyst of the kidney which, for some reason or other, has ruptured into the calyx. When we do, either an intravenous or a retrograde pyelogram, this cyst becomes filled with the contrast media. We do not see this picture very often, although we see solitary cysts of the kidney which do not connect with the calyx, quite often. In Prather's article, he shows sections of the lining of this cyst and in all three cases there is a transitional cell epithelium lining the cavity, which you would not find, as I understand, in a simple kidney cyst. All of his patients had back pains, not very severe, but aggravating, gnawing back pain, and he operated on all of them and excised the cyst. The cyst connects by a narrow tract with the calyx, and he stretches that tract and then closes over the defect. He apparently obtained pretty good results.

I want to present all of our cases illustrating this condition. As I have said, none of these patients has been operated upon. Therefore we do not have any proof of the diagnoses from a pathological standpoint. We do not have much history on most of them either.

The first case was a patient of Dr. Donohue's and, as I recall it, was a boy who was injured playing football and developed hematuria which was the reason for this study. Figure 1, *A* represents what we found on intravenous urography. There is a smooth, round cavity which apparently connects with the tip of a calyx, and which I thought at the time was probably a simple kidney cyst which had ruptured into the calyx. This appearance agrees exactly with Dr. Prather's description of calyceal diverticulum with transitional cell epithelium lining the cavity. This patient had two examinations several weeks apart, and the cyst was a little smaller the second time (Fig. 1, *B*). What that means I do not know.

A PHYSICIAN: Do you have a retrograde on that one?

DR. PETERSON: No, not on that one.

In the second case there was a retrograde examination by Dr. Foley. This patient had dull pain in the right kidney region for three years. At the time these studies were made, there were 8 to 10 red cells in the urine and up to two pus cells. That was all the urinary findings. Guinea pigs were inoculated with urinary sediment and no tubercle bacilli were found. The final urologic diagnosis was a renal cyst. I think there are probably two of them shown in Fig. 2, *A*. You can see an overlapping shadow. The smaller shadow might be a loculation of the larger one. At least, there are two overlapping pockets contacting the upper calyx. Strangely enough in the three cases that were reported in Prather's article the diverticuli were all in the upper pole and in all of our cases are toward the upper pole and none in the lower pole. Prather mentions that it is important to obtain straight lateral views, if operation is contemplated. The cysts are not very large and may be difficult to locate on exploration without a lateral view to show whether it is anterior or posterior in location. Figure 2, *B* was made after the catheters had been removed and the dye had drained out, except for a residuum in the cyst cavity. I do not know just how many minutes later this was taken.

DR. KANO IKEDA: How about the calyces around it?

DR. PETERSON: They are all a little ragged. I think they are a little spastic, and there is a little bit of pyelorenal backflow which makes them look a little roughened.

The third case is a little bit different in that there is not a very large cavity. This patient has been followed for about three years without any change in the size of the cavity. The tract leads out from the calyx to a little puddle toward the periphery of the kidney. I thought originally that this probably was the residual of an old healed abscess, but now I think a renal diverticulum is more likely. Films were made in 1940 and the next examination was made in 1943. The film taken in 1943 (Fig. 3), taken two to three years later is identical.

The fourth patient had back pain. The urine was normal. This back pain had started on two occasions as an ureteral colic, persisted as kidney pain for several days and then gradually wore off. The first attack was six years ago after which the first films were made. Another attack followed a period of no pain and then the pain gradually wore off. Prather says in his paper that these diverticula are frequent sites for the formation of stones because of the poor drainage from them. It is possible that this patient had stones which were the source of her colic. The x-ray (Fig. 4, *B*) shows a collection of little faceted stones all fitting together. At first glance, you would be practically certain of gallstones. You would not suspect kidney stones in a little cluster like that, and the location agrees pretty well

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with the gall-bladder region. This is a retrograde urogram and here is the little sinus tract leading up to the collection of stones and the dye now has surrounded this little cluster of stones which is out toward the

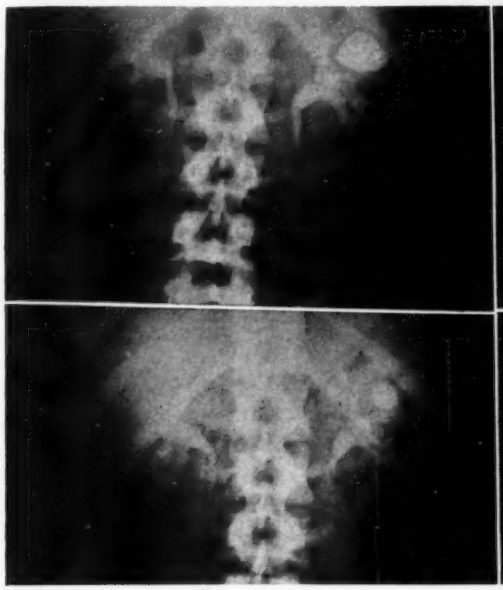


Fig. 1. *A* and *B*.

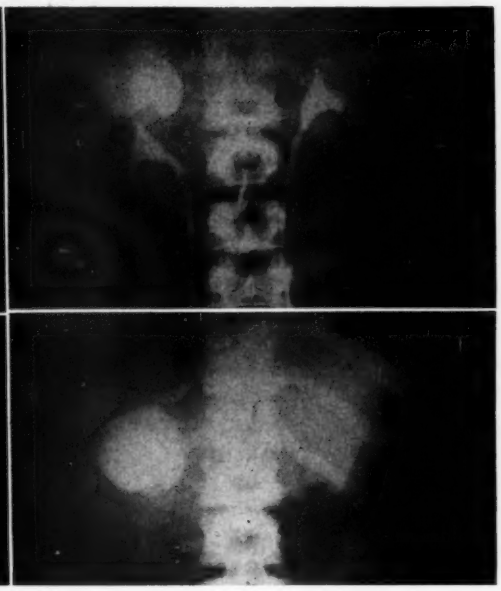


Fig. 2. *A* and *B*.

periphery of the kidney (Fig. 4, *A*, *B*). I think this is a good example of one of these diverticula with formation of stones within it.

The fifth case probably comes into this group, although it is not as well established as the others. This case shows a large calculus in the upper part of the kidney. The first film was made in 1937. Here is another film made in 1942, five years later. The calcification is growing and the lateral view shows it to be posteriorly in the kidney region. We have an intravenous urogram but no retrograde. There is no evidence whereby you could say that dye got up around the stone. It looks perhaps a little more hazy, as though there was some contrast media around it, but it is not definite. Because it is located toward the periphery of the kidney, it is not likely to be a renal stone in the usual sense, but it could very well be a stone in a diverticulum of the kidney (Fig. 5).

Discussion

DR. FREDERIC E. B. FOLEY: I do not know much about calyceal diverticulum. Prather's paper gave an excellent description of the gross lesion, clinical diagnosis, and surgical treatment. It did not contain definite histologic or histopathologic proof that the cavity is a diverticulum of the calyx in the restricted meaning of the term "diverticulum." That would require that the lining cells of the diverticulum and its communicating passage with the calyx be identical with the epithelium of the pelvis and calyces. Prather did not give convincing evidence that they are identical. The cells of the papillary ducts and the cells of the calyces, in fact the cells of all the excretory channels from bladder to distal convoluted tubule, are derived from the same structure: the Wolffian duct. The differentiation between them is not great. So, it becomes a rather hair-splitting question to say whether the pressure affected cells of these cavities are calycine cells and that the cavity, therefore, is a diverticulum of the calyx or that they are the more differentiated cells of papillary ducts or other parts of the tubular system, and that the cavity, therefore, is a cystlike dilatation communicating with the calyces. It is a question for answer by the histopathologist or embryologist rather than the clinical urologist.

I would like to ask Dr. Ikeda and Dr. McCartney: If an individual papillary duct were obstructed, not unlike the back pressure on all ducts that occurs in hydronephrosis, and became dilated, could you with certainty distinguish its pressure-altered cells from the epithelial cells of the calyces? I doubt it.

DR. JAMES MCCARTNEY: I do not think you could, all the time, because you would expect to have a single layer of epithelium, whereas if it is the pelvic epithelium you would expect to have multiple layers. Now, undoubtedly in one of these things, as in cysts elsewhere, the tension may be so great that the epithelial lining may become completely destroyed, and all you apparently have is simply a fibrous wall. You see that

rather commonly in the larger cysts of the breast, and you see it not infrequently in some of the cystomas of the ovary, some with good epithelial lining and others with apparently no epithelial lining at all. But if it is a true pelvic epithelium, then I should say you would have to have multiple layers before you would be certain.

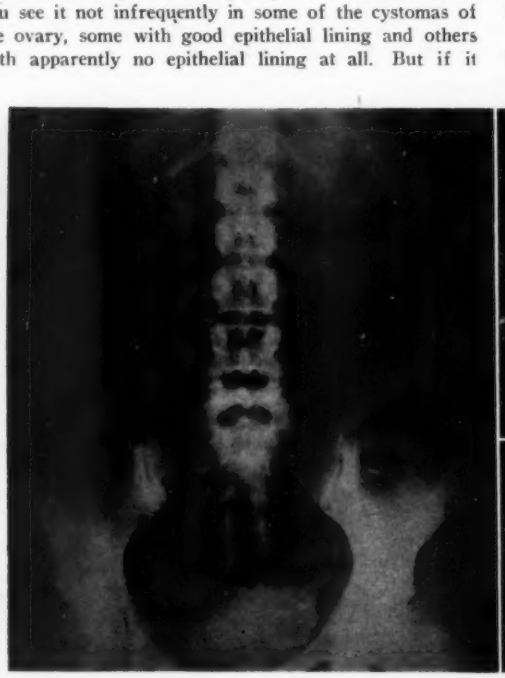


Fig. 3.

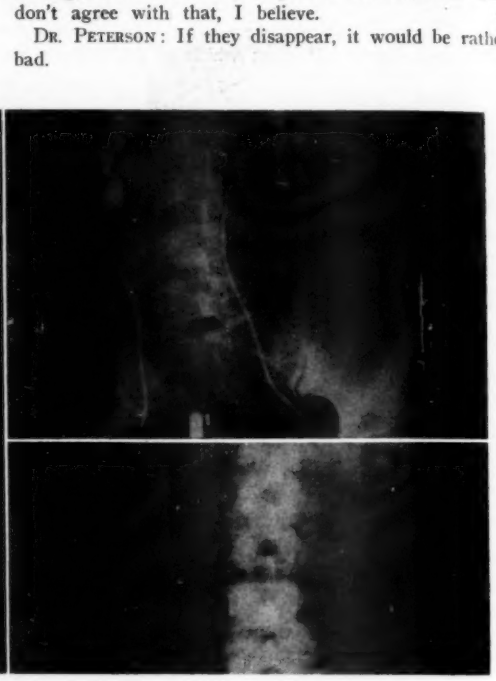


Fig. 4. *A* and *B*.

DR. FOLEY: I am not so sure that it is a good term, calyceal diverticulum. I am not convinced that it truly describes the lesion, but I will join Dr. Peterson in use of the term, for it is more convenient than "renal cavity communicating with the pelvis."

DR. PHILIP DONOHUE: I brought a very brief history of Case I of Dr. Peterson's series, a young man, 18 years of age, who on the 9th of October was playing football and was kicked in the left upper abdomen, but was able to continue playing, and nothing was brought to his mind until the middle of the game between the halves. When he voided, he noticed that his urine was very bloody, and I saw him at the suggestion of a doctor because of rather gross hematuria. Now, that hematuria had cleared up by the time I saw him the next day. He had never had pain in his flank. Of course, he was only 18 years of age and possibly later on he would have acquired some symptoms. We have a film that was made about three months later. The only point that I have in mentioning about this patient is that these cavities have changed. This one is decidedly smaller. I don't say that this can be proven to be traumatic, but if this cavity should disappear, it might have a point. I think it ought to be watched before it is diagnosed or settled as a proved diverticulum. You don't agree with that, I believe.

DR. PETERSON: If they disappear, it would be rather bad.

DR. DONOHUE: When he was last seen, sometime in January, or two months later, he was trying for enlistment. He was without symptoms. He had a few red cells in his urine. Prather himself mentioned the fact that the subject was controversial as to etiology but I don't believe as to treatment. Dr. Foley didn't mention this, but I might, that it is true that such cavities are found in people with symptoms such as Dr. Peterson has described. The stones are frequent complications. It has been feasible to remove the portion of the kidney when the space is located at the upper or lower pole by a so-called heminephrectomy. In Prather's case, the space was in the area between the calyces in the middle of the kidney, and he seemed to excise the cortex of the kidney and obliterate the gap by suture.

DR. FOLEY: The kidney is formed from two structures. From the renal blastema are formed the glomerulus, proximal convoluted tubule, loop of Henle, distal convoluted tubule, and connecting or junctional tubule. From the Wolffian duct are formed the ureter, pelvis, calyces, papillary ducts, and collecting tubules. For a period, there is no communication between the structures derived from the renal blastema and those derived from the Wolffian duct. Union of the two at the junctional tubule completes the secretory unit: the glomerulus and the passageways from it to the pelvis.

Failure of this union to occur makes a very comfortable armchair way of explaining congenital polycystic kidney.

In a schematic way this is what happens. (Drawing).

Vesicles develop in the renal blastema. A knuckle or loop of blood vessel pushes against the vesicle invaginating the wall of the vesicle over the blood vessel like the lining of a cap. As the invagination progresses, the loop of blood vessel elongates into multiple loops or folds forming a tuft. The invaginated wall of the vesicle finally completely covers the tuft down to its narrow neck formed by the afferent and efferent limbs of the vascular tuft as they respectively enter and leave the invagination. In this way, the glomerulus is formed.

At the narrow neck of the vascular tuft or glomerulus, the invaginated layer of cells from the vesicle, which covers the vascular tuft is continuous with the surrounding non-invaginated wall of the vesicle, just as the lining of a cap is continuous with the outer material of the cap itself. The non-invaginated wall of the vesicle—the outer layer of the material of the cap—forms Bowman's capsule. From the outer layer of the cap the proximal convoluted tubules, loop of Henle, distal convoluted tubules, and junctional tubules develop as a passageway continuous with the space between the glomerulus and the glomerular capsule—the space between the lining of the cap and the outer layer of the cap itself.

The ureteral bud from the Wolffian duct grows into the renal blastema. Its stalk forms the ureter and pelvis. As the bud grows, there is a dichotomous branching of it and cleavage of the branches from each other. The primary branches form the major calyces, the secondary and subsequent branches form the minor calyces, papillary ducts, and collecting tubules.

Union of the passageways derived from the Wolffian duct with those derived from the renal blastema occurs at the connecting or junctional tubule. Failure of this union to occur is a not definitely proved explanation for the formation of renal cysts. Congenitally small caliber at the point of union—in fact, anywhere along the tubular passageway from pelvis to glomerulus—with resulting elevated pressure and dilatation between the point of narrowing and the glomerulus would be a not proved explanation for "congenital calycine diverticulum." Narrowing of the passageway in post-fetal life as a pathologic process would be a not proved explanation for "acquired calycine diverticulum."

DR. IKEDA: I have never recognized this condition either at autopsy or in surgical specimens. From time to time, I have seen intrarenal cysts, usually multiple but sometimes single, 5 to 20 mm. in diameter with a thin, smooth, fibrous inner lining, occurring within the cortex of the kidney, without protruding on the outer surface as in a congenital solitary cyst. I have never been able to demonstrate a communication between such a cyst and the adjacent calyx. Furthermore, on section, such a cyst is lined by a layer of flat epithelium. I am convinced from reading Prather's article, seeing the histologic picture of the walls of the cysts he reported, and listening to Dr. Peterson's presentation, that

Fig. 4.

there is such an anatomical and clinical condition as a diverticulum of the renal calyx, in the same sense as the diverticulum of the urinary bladder, the colon, the esophagus, or any other hollow or tubular organs of the body. I can imagine that some of these diverticula may become closed off by an inflammatory process at the neck and become retention cysts, perhaps, to be finally obliterated or filled in by organized exudate or scar.

None of us present here tonight has seen a proven case of calyceal diverticulum. We have no positive proof that these cases represent this condition. However, in the light of the article by Prather, Dr. Peterson's interpretation of these roentgenograms appears to be reasonable, except in the Case I, in which the shrinkage of the cyst in so short a time is difficult to understand, unless it has developed a heavy inner coating of exudate or organized blood to reduce the size of the cavity.

Reference

1. Prather, George C.: Calyceal diverticulum. J. Urol., 45: 55-64, (Jan.) 1941.

METHIONINE

The amino acid, methionine, can now be synthesized and made available at a greatly reduced cost for medical use, more especially for the treatment of liver diseases. The synthetic preparation has all the valuable qualities of the natural methionine previously obtained from the organs of sheep and cattle and also from casein. This sulphur-containing amino acid has been found of particular value in the treatment of liver poisoning resulting from a variety of chemicals such as carbon tetrachloride, trinitrotoluene, arsenic, phosphorus and chloroform. The recommended dosage of four to six or more grams of methionine daily would require four to six or more quarts of milk or 120 grams or more of casin, an impractical amount. The announcement was recently made by U. S. Industrial Chemicals, Inc., of New York.

CASE REPORT

EFFECT OF ANTILUETIC THERAPY ON BUNDLE BRANCH BLOCK

LT. COL. D. E. NOLAN, MC, AUS, and CAPT. GEORGE W. PEDIGO, MC, AUS
Dayton, Ohio

Bundle branch block is most frequently due to coronary arteriosclerosis. Occasionally, syphilitic or diphtheritic myocarditis is responsible for this disorder of rhythm. Even rarer are such causes as tumors, trauma or abscesses. Aside from the functional type, due to myocardial fatigue such as that following bouts of auricular flutter without auriculoventricular block, and the toxic type due to digitalis or quinidine effect, they are not usually amenable to treatment. In the case we are reporting we believe the block was due to syphilis. The restoration of normal conduction after antiluetic therapy may be of interest.

HB, aged fifty-four, negro carpenter, was admitted November 1, 1944 complaining of dizziness, staggering gait, and incontinence of urine of three years duration. He denied ever having syphilis, but our records reveal a positive blood Wassermann as far back as 1930. No complaints referable to the heart were elicited.

Examination revealed a well-developed, well-nourished, comfortable negro male with an ataxic gait. The pupils were irregular and did not react to light. Ocular fundi were normal. The ears, nose, mouth, throat, and neck presented no unusual features. The chest was clear and resonant throughout. Blood pressure was 100/74, pulse 96, temperature 98.6. Rhythm was regular, heart was not enlarged, no murmurs were heard. Tones were of normal quality. There was no cyanosis or edema. Radial and brachial arteries were thickened and tortuous. The peripheral circulation appeared normal. The abdomen was soft, no masses or tender areas were present. The skin, mucous membranes, extremities and joints were within normal limits. Knee kicks and ankle jerks were absent bilaterally. Abdominal, cremasteric, and upper tendon reflexes were normal. There was marked swaying in the Romberg position. Gait was the typical slapping tabetic type. Urinary incontinence was evident.

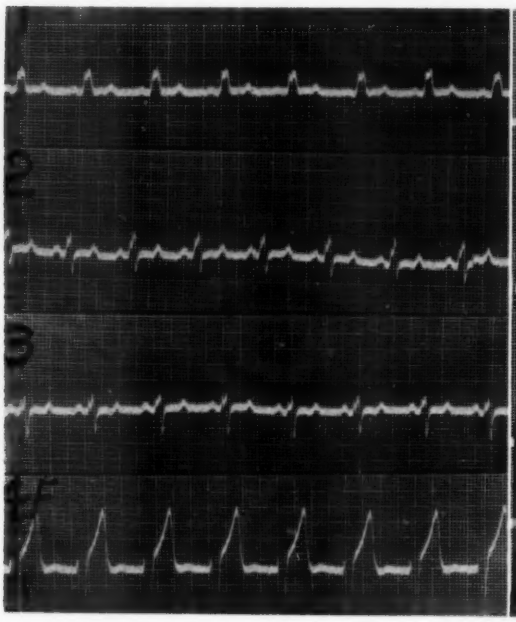


Fig. 1. Electrocardiogram showing left bundle branch block before treatment.

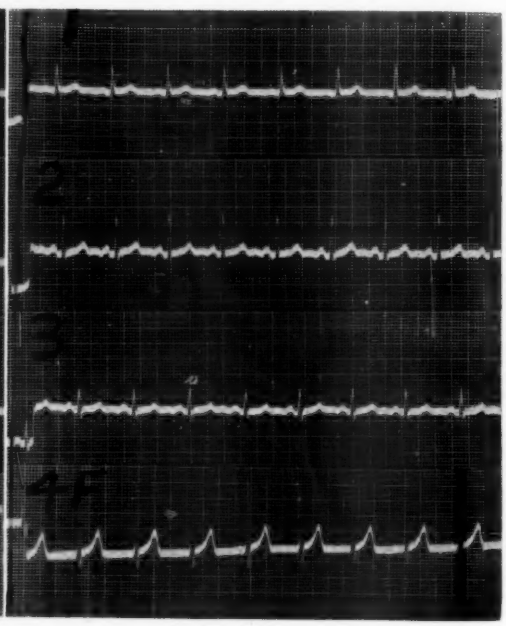


Fig. 2. Electrocardiogram showing return to normal rhythm after antiluetic therapy.

(Continued on Page 592)

From the Medical Service, U. S. Veterans Hospital, Dayton, Ohio.

Published with the permission of the Chief Medical Director, Veterans Administration, who assumed no responsibility for the opinions expressed or conclusions drawn by the authors.

NOTES ON THE HISTORY OF MEDICINE IN FILLMORE COUNTY PRIOR TO 1900

By NORA H. GUTHREY
Mayo Clinic
Rochester, Minnesota

(Continued from May Issue)

Medical Societies

One of the earliest and most significant signs of the postwar change in the attitude toward their professional equipment and status was the effort toward organization of medical societies, and in this movement certain county medical societies of Minnesota antedated the resuscitation of the state medical society (first organized in 1853, revived in 1869). The physicians of the regular school in Fillmore County were among the first to organize, in October, 1866 (following the profession of Winona County by only a few months), and it is interesting that among the most active of the founders, probably the leader, and the first president of the Fillmore County Medical Society, was Dr. Refine W. Twitchell, of Chatfield, who during the Civil War had served four years as a surgeon in the Union Army.

The Fillmore County Medical Society.—In the *History of Fillmore County* that was published in 1882 is the following story of the county medical society. It is quoted here because in it there is inadvertent divergence from fact as to original membership and date of organization which recent research has established:

> FILLMORE COUNTY MEDICAL SOCIETY. This association was organized in the fall of 1862. The first meeting was at the office of L. Redmon, M.D., in Preston and about ten members constituted the society at that time. The objects were for mutual benefit, particularly to increase the medical knowledge and skill of the members.
>
> The first officers of the society were: President, R. W. Twitchell; Vice President, H. Wilson; Treasurer, A. H. Trow; Corresponding Secretary, G. M. Willis; Secretary, T. E. Loop. The other members were Lafayette Redmon, Luke Miller, J. M. Wheat, M. Downelly (sic), C. H. Robbins, R. L. Moore, A. Plummer, A. F. Whitman, H. Pickett, J. A. Graves, H. C. Grover, R. W. Hoyt and M. A. Trow.
>
> For several years the society was in an active condition. There was a regular fee bill and other accessories of such a society, and it had a vigorous growth and life, but the interest finally declined and in 1879 it passed into a moribund condition, from all outward symptoms. However, it may be a case of catalepsy or suspended animation, and the expectant treatment it is receiving may yet resuscitate it to conscious activity, in agreement with the axiom that physicians when sick are totally incapable of treating themselves. The last officers of the society, who hold over until their successors are appointed, were: President, R. L. Moore; Vice President, H. C. Grover; Treasurer, L. Redmon; Secretary, A. F. Whitman. These men are supposed to be regular M.D.s, although to avoid the monotony, the letters after each name are omitted.

The discrepancies regarding original membership that have become obvious are, first, that Milton A. Trow and R. W. Hoyt were mere boys in 1862 and even in 1866 and, second, that R. L. Moore, A. Plummer, A. F. Whitman and H. C. Grover did not enter the county until the late sixties. Of the others, Luke Miller,

M. Donnelly, H. Pickett, J. A. Graves and C. H. Robbins, the last a medical graduate of 1866, although in the county and no doubt early members of the society, were not at the organizational meeting.

There are given here, because they are believed to constitute an authentic record, not previously compiled, official notices relating to the society over a period of its first years that were published in newspapers of Fillmore County. In the *Preston Republican* of November 9, 1866, appeared the following authorized account:

Preston, Minnesota, October 17, 1866.

In accordance with a call published by Dr. L. Redmon of Preston, the following named physicians, practicing in Fillmore County, met and organized, by calling Dr. A. H. Trow of Chatfield to the chair. On motion Dr. G. M. Willis, of Carimona, was chosen secretary pro tem.

Present: Dr. A. H. Trow, Chatfield; Dr. R. W. Twitchell, Chatfield; Dr. T. E. Loop, Spring Valley; Dr. J. M. Wheat, Lenora; Dr. H. Wilson, Carimona; Dr. G. M. Willis, Carimona.

On motion Dr. Twitchell was chosen president of the society for the ensuing year. Dr. Wilson was chosen Vice President, Dr. Loop, Secretary, and Dr. G. M. Willis, Corresponding Secretary. The following named gentlemen were appointed a committee to draft a constitution and by-laws, Drs. Wheat, Wilson and Trow.

On motion the Corresponding Secretary was instructed to correspond with the Corresponding Secretary of the State Medical Society, for the purpose of obtaining a copy of the constitution and by-laws governing that body.

Drs. Wilson, Trow, Loop and Wheat were appointed a committee to prepare a fee bill.

On motion it was resolved that a copy of these proceedings be printed in each of the weekly papers in this county for publication.

On motion the meeting adjourned to meet in Preston on the last Saturday in November at one o'clock p.m.

T. E. Loop, Secretary

Intervening notices were not observed, but in the same newspaper, issue of August 16, 1867, appeared the following statement:

FILLMORE COUNTY MEDICAL SOCIETY: Pursuant to a notice by the President, Dr. Twitchell, of Chatfield, the above society met at the office of Dr. Redmon, in Preston, on the 10th inst.

The President being absent, Dr. C. H. Robbins was elected president pro tem.

The society then proceeded to adoption of a constitution and by-laws for its government.

On motion Dr. Redmon was added to the committee on the fee bill, with instructions to report at the next meeting of the society.

On motion the president appointed Drs. Miller, Redmon and Trow as Censors of the society.

The following individuals were elected officers for the ensuing years: President, Dr. Twitchell; Vice President, Dr. Redmon; Secretary, Dr. Robbins.

The society adjourned to meet at Preston on the second day of the county fair.

T. E. Loop, Secretary. C. H. Robbins

The next statement, important in its details (changed here only slightly in spacing and in correction of a few obviously typographical errors) was printed in the issue of the *Preston Republican* of December 13, 1867:

FILLMORE COUNTY MEDICAL SOCIETY: At the meeting of the Fillmore County Medical Society, held at Preston, the 11th day of October, 1867, the following Fee Bill was unanimously adopted.

Counsel Fee, or medical advice according to circumstances	$ 1.00 to $ 5.00
Each visit	1.00
Each visit at night	2.00

In each case where the distance exceeds one mile, mileage to be added at the rate of 50 cents per mile.

OBSTETRICAL OPERATIONS

Natural Labor	6.00 to 10.00
Protracted labor	10.00 to 15.00
Instrumental labor	15.00 to 30.00

OPERATIONS ON THE HEAD

Operations with Trephine	10.00 to 20.00
Dressing each time	1.00 to 2.00

MISCELLANEOUS

Dressing cutaneous or superficial wounds, ulcers, abscesses, etc	1.00 to 2.00
Opening small sinuses and abscesses	1.00
Operations for hare lip	10.00 to 25.00
Extirpation of tonsils	10.00 to 20.00
Hydrocele, radical operation	10.00 to 20.00
Hydrocele, palliation by puncture	5.00 to 10.00
Phimosis and Pharaphimosis	5.00 to 10.00
Paracentesis	5.00 to 10.00
Operations for Fistula in ano	10.00 to 20.00

HERNIA

Reducing hernia	5.00 to 10.00
Other cases under this head	25.00 to 75.00
Each dressing under this head	1.00

FRACTURES AND DISLOCATIONS

Fractures of humerus and dressings	15.00 to 20.00
Other fractures and dressings	10.00 to 100.00
Dislocation or fractures of fingers and toes with dressing	5.00

Extirpation of encysted or cancerous tumors	10.00 to 25.00
Cutting for stone in bladder	25.00 to 50.00
Cutting for stone in urethra	5.00 to 10.00
Postmortem examinations when ordered by coroner	15.00 to 30.00
Examination of Vaginum with speculum	3.00 to 5.00
Examination of lungs and heart with stethoscope	2.00
Office consultation	1.00
Malformations, operations for	15.00 to 50.00
Gonorrhea, simple	5.00 to 10.00
Syphilis	10.00 to 25.00
Operation for hemorrhoids	10.00 to 20.00

AMPUTATIONS

The shoulder, hip, breast, leg or thigh, fore and back arm	25.00 to 100.00
Amputation of fingers and toes	3.00 to 5.00

ANEURISMS

Operations for popliteal, femoral, inguinal, carotid and axillary aneurisms	30.00 to 100.00
Aneurisms of hand and foot	20.00 to 30.00

Compound fractures of all kinds one-half more than simple. Other chirurgical cases not here mentioned either to be proposed to the society for their decision, or to be charged as nearly to the tenor of this table as possible.

L. REDMON, Secretary — R. W. TWITCHELL, President

Still another notice was that in the *Chatfield Democrat* of May 23, 1868:

First regular annual meeting of the Fillmore County Medical Society will be held at Preston on Monday, the 8th of June next. An address will be given by the President, also an essay, by Dr. Luke Miller, after the regular business of the Society has been attended to. A full attendance by the members of the Society is requested. The community at large is also respectfully invited to attend the evening exercises.

At this point is interpolated a brief review of the organization of the Minnesota State Medical Society and the earliest activities of the society in its bearings on the conduct of county medical societies in general and on the medical societies of Fillmore County in particular. On July 23, 1853, a Minnesota State Medical Society was organized, but for several years previous to 1869 meetings had not been held. In January, 1869, a call was issued to the members of the society and to the profession generally throughout the state for a meeting to consider the expediency of reviving the old society or of organizing a new one. At a meeting held in St. Paul on February 1, 1869, the old society was declared to be defunct and the new state medical society came into being. Although soon afterward the names of various physicians of Fillmore County were on the roster, there is not evidence that a representative of this county was present at the initial meeting.

From the first, the Minnesota State Medical Society concurrently furthered legislation for the protection of the public and the medical profession from abuses of quackery; and it also gave impetus to medical education and the correlated improvement in medical practice and to the organization of component groups in the counties of the state, which should be as "pillars upon which the society will securely rest."

The first resolution adopted by the new state society was "That in case the Legislature now assembled, desire to protect the citizens of the state from quackery, it is the duty of the society to co-operate with the Legislature, and lend its assistance in framing all needful laws upon the subject and that Drs. Willey, Sheardown and Stewart be appointed a Committee as the organ of the Society, for this purpose." The efforts of the society toward legislation had unforeseen results. To quote Miss Clapesattle:

> The legislature of 1869 passed "An Act to protect the people of Minnesota from empiricism and imposition in the practice of medicine." This made it unlawful for anyone to practice medicine in Minnesota unless he had graduated from a two-year medical course or could show a certificate of qualification from some state, district or county medical society. But the sponsors of the Bill had failed to include adequate means for its enforcement, they had not guarded sufficiently against the fake sheepskins of the diploma mills, and they had not considered how easy it would be for the irregular sects to organize medical societies and issue certificates of qualification. (The eclectic physicians, for instance, immediately gathered at Owatonna to organize the Minnesota State Eclectic Society, of which Dr. N. S. Culver of Rochester was made Secretary.) Either because of these defects or because of public opinion that the bill was "class legislation" for the sole benefit of the profession—a charge vigorously denied at the state society's next annual meeting in 1870—the law was considered a failure, and at the next session of the legislature the doctors worked as hard to get it repealed as they had to get it passed. They succeeded and nothing more was done to standardize medical practice by law in Minnesota until 1883.

It is interesting, in view of the legislation of 1869 and its result, that in 1870, at the annual meeting of the state medical society, a committee made up of Drs. C. N. Hewitt, A. E. Senkler, C. Hill and C. H. Boardman reported: "Your committee, after serious deliberation, expresses the belief that laws regulating the practice of medicine, do not and cannot, reach the cause of success of quackery among the people, but that that cause is to be found in the deficient knowledge on the part of the people in regard to the real ground upon which the practice of medicine rests, and that as long as that deficiency exists, quackery will flourish. If legislative action is to be had, it should be directed to the removal of that cause."

The third resolution of the state society, in 1869, and the second that is germane to this discussion, provided that a committee of one from each county be appointed to report the names and number of practicing physicians in his respec-

tive county; also the number practicing in the county who were not recognized as physicians by the state society, and their classification. Presently there was made part of the by-laws the provision that the board of censors was to examine all applicants for the diploma of the society. The censors were to constitute a quorum and they were to require of the applicant satisfactory proof that he had studied medicine with some physician and surgeon duly authorized to practice his profession, at least for three years; that he had attended at least one course of lectures in a school of medicine recognized by the American Medical Association; that he had been in reputable practice for a period of not less than five years; and that he was of good moral character. They were then to examine him in the several branches of medicine and surgery and, if such examination were satisfactory, they gave a certificate to that effect to the president or the recording secretary of the Minnesota State Medical Society. And throughout this formative period of 1869 and later, there were reiterated requests from the society to all members of the profession throughout the state, who had not already done so, to organize county societies.

The response of the Fillmore County Medical Society to the Act of 1869 and to other stimulation offered by the state society was prompt and unmistakable, as witness the following three notices in issues of the *Preston Republican* in the spring of 1869:

MEDICAL NOTICE (May 7, 1869): The Fillmore County Medical Society will hold a special meeting in Preston on Wednesday, the 19th inst. for the purpose of transacting such business as the act of the Legislature, approved March 9, 1869, renders necessary. Members of the profession in regular standing are cordially invited to meet with us, as an opportunity will be given for all such to become members.

R. W. TWITCHELL, President
Fillmore County Medical Society

NOTICE (May 21, 1869): The Fillmore County Medical Society will hold its annual meeting at the office of Dr. Redmon in Preston, Monday, June 7, 1869, at 10 o'clock a.m., to transact such business as may properly come before it. A general attendance of the physicians of the county is earnestly requested as business of importance is to be transacted.

C. H. ROBBINS, Secretary R. W. TWITCHELL, President

Most significant was the notice of June 25, 1869:

ANNUAL MEETING OF THE FILLMORE COUNTY MEDICAL SOCIETY: The society met on June 7, 1869, at the office of Dr. Redmon, in Preston, and was called to order by the President. Dr. Donnelly was elected secretary pro tem.

Dr. Trow, Treasurer, made his annual report which was accepted and adopted.

Dr. Redmon moved to elect delegates to attend the State Medical Society at Owatonna and Drs. Twitchell, Trow, Redmon, Miller and Donnelly were elected.

Dr. Redmon moved that the President appoint a committee of three to revise the fee-bill and report at our next meeting; passed, and Drs. Redmon, Twitchell and Robbins were appointed and the following resolutions were introduced and adopted:

Resolved, that the code of ethics adopted by The American Medical Association shall be our guide in our professional intercourse.

Resolved, that we will not fraternize with, or meet in consultation any one except a graduate of some incorporated Medical College, who sustains a good moral character, provided he is not a student reading with some member of this society, or a physician who has been approbated by the Board of Censors of some regular society of the State of Minnesota.

Resolved, that each member of this society shall inform the President thereof in writing, at what college he graduated, giving the date of his diploma, on or before the 10th day of July, 1869, and should any one neglect to comply with the provision of this resolution, his name shall be stricken from the constitution.

Resolved, that no person hereafter shall become a member of this society until he has

informed the President in writing, at what college he graduated, giving the date of his diploma, or be admitted by the vote of the society at some special or monthly meeting.

Resolved, that Dr. Redmon is hereby requested to prepare a list of the regular graduates of this county; also a list of the nongraduates and irregular practitioners, and report the same to the State Medical Society.*

Resolved, that whenever a member of the society moves from the state he thereby loses his right of membership.

Resolved, that we should adjourn to meet on the second Monday of July, 1869, at 1 o'clock p.m.

Resolved, that we will not act as experts in any case in court without receiving beforehand a fee of not less than $5.00.

Whereas, medical societies are organized for the diffusion of knowledge among members, therefore

Resolved, that each member will be expected to read an essay on some medical subject, or report the history of some case as occurred in his practice for discussion, at each meeting of the society.

The following officers were elected for the ensuing year: R. W. Twitchell, President; L. Redmon, Vice President; A. H. Trow, Treasurer; M. Donnelly, Secretary.

NN. Board of Censors: Drs. L. Redmon, L. Miller and A. Plummer.

Dr. Redmon moved that the Secretary forward copies of proceedings to the county newspapers and to the Chicago Medical Journal.

Motion to adjourn carried.

After the action thus recorded had been taken, the Fillmore County Medical Society presumably continued its activities, at least intermittently, until the time, in 1879, when it suspended operations, as stated in the note from the *History of Fillmore County* of 1882, quoted previously. The officers holding over to a better time were, to repeat, Dr. Russell Moore, President (there is record that he was president in 1876 also), Henry C. Grover, Vice President; Lafayette Redmon, Treasurer; Alvah F. Whitman, Secretary.

Subsequent notices, if published, have not come to the attention of the writer, with the exception of the following vital announcement in the *National Republican* (successor, in 1881, to the *Preston Republican*) of October 12, 1882:

THE FILLMORE COUNTY MEDICAL SOCIETY is hereby called to meet at Lanesboro, Thursday, October 19, 1882. Every doctor interested in sustaining a medical organization in our county is cordially invited to be present.

R. L. MOORE, President

*In June, 1869, of the 119 regular practitioners of medicine in the state, eleven were in Fillmore County; and of the ninety-three irregular practitioners, Fillmore County had eight.

(To Be Continued in the July Issue)

President's Letter

MINNESOTA'S MEDICAL CARE PLAN

Minnesota's medical care plan has not been publicized. In fact, it is not generally recognized. Yet, in view of the fact that it is operative, perhaps crystallization of it in some such brief form as a letter like this, may provide it not only clearer definition, but more universal and widespread recognition.

It does embrace the entire population of the state. Hence, the size of the three component population groups, the wealthy, the middle class, and the indigent and marginally indigent, and medical care policies for these groups require discussion.

The Wealthy.—According to statistics presented at the 1938 House of Delegates meeting, the average annual family income in Minnesota in 1933 was $1,750, and only 6 per cent of the population were earning $2,500 or more a year. From these figures, it is apparent that Minnesota is a medium or low average income state. Furthermore, the wealthy persons of the state do not exceed 10 per cent of the population. So far as wealthy persons are concerned, the cost of medical care is not important, nor does it constitute a barrier to the best medical service anywhere available. In fact, from both England and Germany has come word that between 5 and 10 per cent of the population of these countries were sufficiently wealthy to obtain medical care from other sources than health insurance. So, too, in Minnesota, it can be assumed that up to 10 per cent of the population is wealthy enough not to seek low-cost medical care.

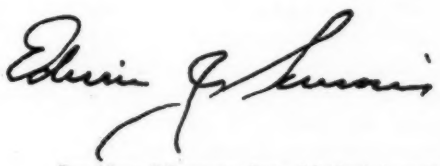
Indigent and Marginally Indigent.—This is that portion of the population which cannot provide medical care for itself. Some unit of government, township, municipality, county or state is financially responsible for seeing that members of this group have medical care.

How large is this group in Minnesota? Indigency in Minnesota, in 1937, reached a peak involving 497,500 persons, 20 per cent of the population. Statistics from the Division of Social Welfare in January, 1946, showed 163,000 persons in the state to be indigent or marginally indigent, or 6 per cent of the population. From these figures it appears reasonable to assume that an average of not over 10 per cent of the population falls into this classification.

One might ask, "What is the State's policy of providing medical care for this group?" In the first place, administration is always on a local or county basis, through township, municipality or county agencies. State and Federal participation is on a financially-supplementary, policy-advisory capacity.

In order to keep costs within the ability of taxpayers to pay, physicians and dentists have voluntarily accepted a reduction of one-third of their bills for medical and dental services for indigents. Ophthalmalogists, optometrists, oculists and optical houses have been providing services and glasses, respectively, at lower cost for indigents than for pay-patients. Arrangements for drugs on a cost-plus basis for indigents, as already exist in New York, Chicago and other places, were under discussion with the Minnesota State Pharmaceutical Association in the early days of the war. Many of the hospitals of the state provide hospital care to this category of patients at cost, plus a small margin of profit. Briefly, then, for the indigent ten per cent of the population in Minnesota, the medical and allied professions provide medical care at a cost appreciably lower than that for pay-patients.

The Middle Class.—It is seen that 80 per cent of the people of Minnesota are to be classified as in the medium or low income bracket. It is, then, for this large group that Minnesota's Prepaid Medical Care Program is being arranged. As this project becomes operative, adequate medical care, with free choice of physician, at a cost which they can afford will be available to medium or low income families.



President, Minnesota State Medical Association

Editorial

CARL B. DRAKE, M.D., *Editor;* GEORGE EARL, M.D., HENRY L. ULRICH, M.D., *Associate Editors*

THE STATE MEDICAL MEETING

THE ninety-third annual session of the Minnesota State Medical Association, which was held in Saint Paul in May, is now a matter of history. A total of 1,852 physicians attended, 1,653 of them being Minnesota physicians. In addition, 128 interns, 246 nurses, 363 Auxiliary members and 460 exhibitors registered.

The most important subject which came up for consideration of the House of Delegates was the report of the Committee on Organization for Prepaid Medical Service. This subject of a voluntary prepaid medical insurance company sponsored by the organized medical profession of the state to provide medical care for the people of the state is perhaps the most important one ever to have been considered by any House of Delegates of the Association.

The question has been uppermost in the minds of the committee and those of the membership who have been seriously considering the proposition as to whether the Association should sponsor Plan A or Plan B. Plan A, in brief, would be an organization incorporated by the Association members to provide for medical service to the public authorized by the enabling act passed by the State legislature. In accordance with Plan B, we would sponsor indemnity insurance provided by insurance companies. Opinion seems to have been about equally divided as to the virtues of each plan.

The Committee on Prepaid Medical Insurance favored Plan A on the grounds that this plan is more in keeping with commitments made the public.

Active steps will, therefore, be taken to obtain subscriptions to the amount of $100,000 from the membership, and to ascertain whether the facilities of the Minnesota Hospital Service can be utilized for the sale and collection of premiums on Minnesota Medical Service policies. The recommendation of the Reference Committee of the House of Delegates which considered this report —that in order to accomplish as complete a coverage of the residents of Minnesota in the shortest possible time the commercial insurance companies receive the hearty co-operation of physicians in their offering of indemnity medical isurance—is a good one. Policies providing medical indemnity insurance have been obtainable for some time, and the Saint Paul Mercury Indemnity Company has announced a new policy since our annual meeting. There is room in the field for both commercial insurance companies and Plan A.

When the necessary $100,000 has been subscribed and the proposed plan for the Minnesota Medical Service organization has been set up in detail, a special meeting of the House of Delegates will be called for consideration and final approval.

Another matter that came before the House of Delegates, which is of great importance, is the contract the Minnesota State Medical Association is about to make with the Veterans Bureau, whereby the Association will contract to examine and provide medical and surgical care for veterans suffering from service-connected disabilities. Veterans will be authorized to consult physicians of their choice from among members of the Association registered with the Association for the rendition of such services. The membership will be given an opportunity to register for such service by agreeing to a price schedule of fees which is to be revised before submission. The State Medical Association will collect the sum total of fees from the Veteran Bureau monthly and transmit payments to members.

The success of this undertaking depends entirely on the co-operation and conscientious rendering of service to the veterans by our members. With wholehearted co-operation, the veterans will thus be able to receive prompt and efficient medical care at home.

Officers elected by the delegates to serve for the coming year are:

President, Louis A. Buie, Rochester; First Vice President, Carl B. Drake, Saint Paul; Second Vice President, Lawrence R. Gowan, Duluth; Secretary, Benjamin B. Souster, Saint Paul; Treasurer, William H. Condit, Minneapolis; Speaker, William A. Coventry, Duluth; Vice Speaker, Charles G. Shepard, Hutchinson.

ACADEMY OF PEDIATRICS SURVEY

THE American Academy of Pediatrics has begun a nation-wide survey of the facilities for the medical care of the infants and children of the country. Its purpose is to determine as exactly as possible the supply of doctors, dentists, nurses, hospitals and clinics for the prevention and cure of disease in this group. The survey will be made on a state-wide basis, and the study in Minnesota is to be sponsored by the Northwest Pediatric Society, backed by the Minnesota State Medical Association. In order to obtain this mass of information, doctors, dentists, nurses, hospitals and all agencies associated with health activities will be asked to fill out forms which, we are assured, are to be as simple as possible.

An office has been established in the Division of Child Hygiene of the Minnesota State Board of Health to accommodate the Executive Secretary of the American Academy of Pediatrics survey, who will conduct the tabulation in Minnesota.

The real purpose of the survey is to evaluate the facilities for providing for child health in the state, in order to stimulate local groups to evaluate the resources in their own communities as a background for local planning. It is stressed that there is no thought of obtaining information which might be used by social planners as an excuse for further government invasion of private practice. The Academy is opposed to the use of government funds for the medical care of those able to provide good medical care from their own resources. The Academy has placed itself on record as opposed to the Pepper bill, which provides for comprehensive medical care for the youth of the country up to the age of twenty-one, irrespective of economic status. It has expressed its opposition to numerous additional objectionable provisions of the bill also. It does, however, favor steps to provide good medical and dental care for the infants and children of the country by use of public funds, if need be, and even by federal subsidy of states, if that can be shown to be necessary.

The co-operation of every doctor, dentist and agency to whom a questionnaire is sent will be necessary for the success of this survey. The undertaking has the endorsement of the Council and House of Delegates of the Minnesota State Medical Association. Its prime purpose is the ultimate betterment of the health of the children of state and nation at large.

NEW OPERATIVE PRINCIPLES OF THE CO-OPERATIVE MEDICAL ADVERTISING BUREAU OF THE AMERICAN MEDICAL ASSOCIATION

The Co-operative Medical Advertising Bureau was established by the Board of Trustees of the American Medical Association many years ago to provide advertising of nationally marketed products for state medical journals. Rules adopted provided that only products approved by the various Councils of the American Medical Association, such as the Councils on Pharmacy and Chemistry, on Foods and Nutrition, on Physical Medicine, and on Medical Education and Hospitals, would be accepted by the Bureau and state journals.

In October, 1945, a letter was received from Dr. Olin West, Chairman of the Advisory Committee of the Co-operative Medical Advertising Bureau, which includes, besides Dr. West, the editors of five state journals, stating that because a number of state journals which were members of the Co-operative Medical Advertising Bureau had been violating the rules and had been accepting national advertising not approved by AMA Councils, the Board of Trustees of the AMA was seriously considering terminating the Bureau. This would mean that each state journal would have to go to the expense of procuring its own advertising of nationally marketed products or another co-operative bureau would have to be established.

Therefore, a meeting of editors and business managers of member journals was called to meet in Chicago on December 1, 1945. Your editor represented MINNESOTA MEDICINE at this meeting. After a day's discussion it was decided that every effort should be made to continue the CMAB and to make an effort to provide for some liberalization of the regulations which were felt by some representatives of the journals to be too rigid. On December 2, 1945, the journal representatives met with the trustees who stated their viewpoint and their proposals for the continuation of the CMAB. After considerable discussion it was decided that the Advisory Committee of the CMAB, in co-operation with a committee of the Board of Trustees of the AMA, should draw up a new statement of the Operative Principles of the CMAB to be submitted to representatives of the state medical journals at the Secretaries and Editors Conference to be held in February, 1946. This was done.

The new Operative Principles provide for the administration of the CMAB by the Board of Trustees of the AMA. Its affairs are to be conducted by a director. Incidentally, the former director, Mr. Sandberg, has been replaced by Mr. Alfred J. Jackson. Principles and policies are to be developed by a consulting board consisting of the Advisory Committee of the CMAB, who are editors or business managers of state medical journals, with the General Manager of the AMA, the Chairman of the Advertising Committee of the AMA and the secretary of the Council on Pharmacy and Chemistry of the AMA.

The state journals agree to abide by the standards of advertising of the AMA in all fields covered by the various Councils of the AMA. The New Operative Principles are to be submitted to the official controlling

bodies (the Editing and Publishing Committee) of the state journals for approval. After approval by a state journal, that journal shall terminate contracts for advertising of any items not approved by the AMA Councils at the expiration of such contracts, and at the latest by January 1, 1947. No new contracts shall be made for unacceptable products in the future. When there is doubt as to the extent of usage of a product, the question is to be referred to the Advisory Committee of the CMAB. If a state journal fails to correct a violation of the agreement within ninety days after being notified by the director of the CMAB of such violation, this shall be considered evidence of withdrawal of the member periodical from co-operation with the CMAB.

Briefly, Council-accepted or exempted articles are acceptable. Exempted articles are established articles not requiring Council action and so listed. Products of local concerns only which have not been passed on by any AMA Council shall be acceptable advertising provided they are not presented in a false or misleading light in the opinion of the publication committee of the journal concerned.

MINNESOTA MEDICINE has made every effort to adhere to the former rules as to the acceptance of advertising and has been prompt to correct the one or two infringements inadvertently made when the error was called to our attention.

It is fortunate that the way has been cleared for the continuation of the CMAB and that the rules have been clarified.—EDITOR.

PNEUMOCOCCIC AND STAPHYLOCOCCIC MENINGITIS

(Continued from Page 559)

10. Pilcher, C. and Meacham, W. F.: The chemotherapy of intracranial infections. III. The treatment of experimental staphylococcic meningitis with intrathecal administration of penicillin. J.A.M.A., 123:330, (Oct. 9), 1943.
11. Price, A. H. and Hodges, J. H.: Treatment of meningitis with penicillin injected intravenously and intramuscularly. New York State J. Med., 44:2006, (Sept. 15), 1944.
12. Rammelkamp, C. H. and Keefer, C. S.: The absorption, excretion and toxicity of penicillin administered by intrathecal injection. Am. J. M. Sc., 205:342, (March), 1943.
13. Rammelkamp, C. H., and Keefer, C. S.: The absorption, excretion and distribution of penicillin. J. Clin. Investigation, 22:425, (May), 1943.
14. Rosenberg, D. H., and Sylvester, J. C.: The excretion of penicillin in the spinal fluid in meningitis. Science, 100:132, (Aug. 11), 1944.
15. Sadusk, J. F. Jr., and Nielsen, A. E., Use of sulfathiazole in staphylococcic meningitis with recovery. J.A.M.A., 116:298, (Jan. 25), 1941.
16. Siegal, S.: Transverse myelopathy following recovery from pneumococcic meningitis treated with penicillin intrathecally. J.A.M.A., 129:547, (Oct. 20), 1945.
17. Street, B.: Staphylococcus aureus meningitis with recovery. Minnesota Med., 24:658, (Aug.) 1941.
18. Sweet, L. K., Dumoff-Stanley, E., Dowling, H. F., and Lepper, M. H.: The treatment of pneumococcic meningitis with penicillin. J.A.M.A., 127:263, (Feb. 3), 1945.
19. Walker, A. E. and Johnson, H. C.: Convulsive factor in commercial penicillin, Arch. Surg., 50:69, (Feb.) 1945.
20. Waring, A. J., Jr., and Smith, M. H. D.: Combined penicillin and sulfonamide therapy in the treatment of pneumococcic meningitis. J.A.M.A., 126:418, (Oct. 14), 1944.
21. White, W. L., Murphy, F. D., Lockwood, J. S., and Flippin, H. F.: Penicillin in treatment of pneumococcal, meningococcal, streptococcal and staphylococcal meningitis. Am. J. M. Sc., 210:1, (July), 1945.

FRACTURES OF THE SKULL

(Continued from Page 561)

terior, one may obtain an estimate of the over-all picture for soldiers who sustain compound, comminuted fractures of the skull in battle. Of 100 such soldiers whom Campbell studied at an oversea center for treatment of injuries of the head, seventy-two were returned to the zone of the interior. Of our seventy-two patients who had been returned from the combat area, one died of brain abscess. Adding this case to the five of Campbell's cases in which the patients died of infection, one obtains the estimate that, of 100 soldiers who sustain fractures of the skull, six die of infection. Similarly, adding the seven of our patients who returned to duty to the twenty-three similar patients in Campbell's series, one obtains the estimate that thirty of 100 soldiers who sustain fractures of the skull return to duty. Finally, sixty-four of 100 soldiers who sustain fractures of the skull are discharged from the Army after definitive surgical treatment and maximal rehabilitation. On account of the lack of data, these estimates do not take account of soldiers who die on the battlefield because of fractures of the skull.

References

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ANTILUETIC THERAPY

(Continued from Page 582)

Laboratory Data.—Roentgenogram of chest showed normal lung fields and cardiovascular shadow. Urinalysis, blood chemistry and hematological studies were normal. Blood Wassermann negative. Kahn negative. Kline 2 plus. Spinal Fluid: Slightly increased globulin, cells 1 per cu. mm.; Wassermann negative in .1 c.c.; negative in .5 c.c.; 3 plus in 1 c.c.; Gold curve 1111000000.

Electrocardiogram November 7, 1944 (Fig. 1.) showed left bundle branch block.

Treatment consisted of alternating courses of bismuth subsalicylate in oil and mapharsen. On December 26, 1944 a recheck electrocardiogram (Fig. 2) showed normal conduction.

Comment.—It appears likely that the intraventricular block was due to syphilitic infection as there was no conclusive evidence of coronary arteriosclerosis, rheumatic myocarditis, diphtheria, bacterial endocarditis, tumors or trauma. In addition, after antiluetic therapy, the bundle branch block converted to normal conduction. No digitalis or quinidine was used at any time.

Summary.—A left bundle branch block converted to normal conduction probably as a result of antileutic therapy.

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association
George Earl, M.D., Chairman

PROLONGING OF HEARINGS ON HEALTH INSURANCE BILL SEEN

According to information from the AMA Council on Medical Service and Public Relations' Washington office, hearings in the Senate Committee on Education and Labor on the Wagner-Murray-Dingell Health Insurance Bill may extend considerably into June.

The hearings, which began April 2, were recessed from May 8 to 23, with the American Academy of Pediatrics and a number of state medical societies to be heard. Osteopaths, chiropractors and undertakers requested a chance to have their say; and it seems likely that they all will be given opportunity to have it.

Hearing Discussions Are Heated

Hearings began with what amounted to a personal fight between Senator Murray, chairman of the committee, who presided, and Senator Taft. Senator Taft in very heated and in no uncertain terms, insisted that the measure under consideration was socialistic, while Senator Murray, even more heatedly, declared that it was not. Senator Taft, when he was refused opportunity to make a statement by Chairman Murray, left the hearing floor.

Representative Dingell appeared then to make his statment, prefacing it with an attack on the AMA, which he charged with "shooting poison gas to confuse and mislead the American people in order to preserve the monopoly which it exercises over the health of the American people." Senator Smith, at that point, interrupted Mr. Dingell's barrage. He pointed out that attacks on opponents were wrongly motivated and reminded Mr. Dingell that what the committee wants is constructive presentation, rather than Mr. Dingell's personal feelings on the matter. Mr. Dingell, however, having heard the objection, proceeded pretty much as before.

Merits of Pepper Bill Inserted in Discussion

Statements of Senator Wagner, also one of the authors of the Health Insurance Bill, and Senator Pepper, designer of the Maternal and Child Welfare Bill, also before Congress at present, were heard. When Senator Pepper took the floor, he could not resist the temptation to put in a plug for his measure.

He stated that compulsory national health insurance is "rock bottom minimum requirement for an effective national health program," but said he, there are certain *other* aspects of health which such insurance cannot cover. He was, of course, referring to the health and welfare of mothers and children, who, he maintains, will have the answer to all of their problems if his proposal becomes law.

Among other things, he suggested that since he, as one of the sponsors of the Maternal and Child Welfare Bill, was equally strong for the passage of the Wagner-Murray-Dingell Bill, perhaps amendments might be fitted into S-1606 so that if it should pass, it would cover essentially what appears in the Maternal and Child Welfare Bill. If, however, the Wagner-Murray-Dingell Bill should not pass, then 1318, the Maternal and Child Welfare Bill, can be considered as a separate measure, he said.

Security Administrator's Statement Heard

Following Senator Pepper, Mr. Watson B. Miller, Federal Security Administrator, took the floor. Mr. Miller said that he had once been interested in a career in medicine and that he took great pride in American medicine's advance. "Nobody is more zealous than I," he said, "for the high ethics of American medical practice. I would not be a party to attempting to force down the throats of American medicine anything that was not right." He also quoted Abraham Lincoln as saying that his conception of government was

"to do for the people only the things they are unable to do for themselves." He concluded that, in view of all this, America "can no longer wait" for compulsory health insurance!

Recent Study Contradicts Mr. Miller

However, a recent study, made by Louis I. Dublin, Ph.D., chief of the actuarial division of the Metropolitan Life Insurance company, in which he probed through voluminous records, would indicate that America definitely *can* wait before launching into political medicine.

Mr. Dublin found that while the cream of the nation's youth was in the armed services and the average age of the civilian population has been considerably higher than normal, the civilian death rate was gratifyingly low.

The year 1945, he reported, brought new lows in the death rates of pneumonia, tuberculosis and appendicitis—maternal and infant mortality were down too!

Cancer was noted to be statistically on the increase. This, however, he explained, was due to (1) the aging of the population and (2) wider recognition of the disease because of educational effort.

Times Reports Dublin's Findings

The *New York Times,* long-known to lean toward Federal compulsory sickness insurance, reported the findings of Dr. Dublin. Later that same week, it stated in an editorial that while the AMA might be able to develop a national plan for prepaid medical service, the U. S. "couldn't wait for experimentation." It further stated that "coverage must be comprehensive and scope national."

The president of the Massachusetts Medical Service, Dr. James M. McCann had something to say on the matter. He told the newspaper bluntly that it was using "a choice political weapon to create confusion." He noted that Dr. Dublin had found the nation's health to be at a high level in 1945, and that certainly, in view of that report and the consensus of other leading health authorities, the nation "is sufficiently healthy to permit a little time to adjust in a democratic manner to changing social and scientific techniques in the fields of medicine and science."

Other Notables Appear at Hearing

Harold L. Ickes, in his capacity as executive chairman of the Independent Citizens Committee of the Arts, Sciences and Professions, appeared at the committee hearing on compulsory health insurance on April 10. He, too, like Mr. Miller, took the attitude that he would be the last one to do an injustice to American medicine. Said Mr. Ickes:

"I would be the last to deny that the country doctor has produced miracles in his time, but I think that the country doctor who has performed these miracles for years without adequate tools of his profession to help him deserves a better fate than to be consigned forever to caring for his patients through the medium of a bag of pills and a stethoscope."

He then cited what he considered "the woeful lack" of medical facilities in this country and joined with the other proponents of compulsory health insurance in hailing the Wagner-Murray-Dingell Bill.

At this point, Senator Donnell, Missouri Republican, began to question Mr. Ickes' statements. Senator Donnell revealed by his questions beyond the shadow of a doubt that Mr. Ickes, himself, was "woefully lacking" in knowledge of current activities in the field of medical care. Senator Donnell, a member of the examining committee, had previously joined the doctors' side in the running debate.

Following Mr. Ickes, Dr. Allen M. Butler, associate professor of pediatrics, Harvard medical school, made his statement. And in turn, two ministers; the executive secretary of the American Association of Social Workers; William Green, AFL president; and representatives of the National Association for the Advancement of Colored People and the National Women's Trade Union League of America, were heard. All favored the Wagner-Murray-Dingell side of the the controversy.

Dr. Sensenich Speaks for Medical Profession

Next witness for the defense of American medicine was Roscoe L. Sensenich, chairman of the board of trustees of the American Medical Association; he was engaged in lively debate by Senator Pepper, who tried unsuccessfully to tear down the argument of the AMA and charge it with obstructionism.

Dr. Sensenich reminded all present that the AMA has a ten-point program for the maintaining of this country's present high level of health care. The AMA, he said, urges a minimum standard of nutrition, housing, clothing and

recreation, fundamental to good health. To quote Dr. Sensenich:

"The responsibility for the attainment of this standard should be placed as far as possible on the individual, but the application of community effort, compatible with the maintenance of free enterprise, should be encouraged by governmental aid where needed. That is the background of the position that the American Medical Association has taken with reference to the Hill-Burton Bill and other legislation relating to health matters."

Citing statistics, page and line, to prove his assertion, Dr. Sensenich, with Senator Donnell in agreement, stated that "positive proof exists from experience in other countries that inferior medical service results from compulsory health insurance." Senator Donnell added that, according to statistics published in the Encyclopaedia Britannica Book of the Year, 1943, of the comparative death rates of the larger nations, that the rate in the U. S. was 10.5, and in England, 12.9. He pointed out that England has a compulsory health insurance system.

"The comparative death rates between that of England and the United States, and between that of other countries and the United States," said Senator Donnell, "would tend, Dr. Sensenich, to substantiate you that the health conditions in this country are on the whole certainly favorably compared with those of other nations."

Dr. Sensenich cited a study by Dr. Walter Kennedy, of Newcastle, Indiana, of health conditions in foreign countries, employing compulsory health insurance, which bore out, with indisputable evidence, that the "abominable health conditions" of this country which Wagner-Murray-Dingellites have made their hue and cry for so long, are gross exaggerations.

PHYSICAL MEDICINE SPECIALISTS SEEK NEW ONE-WORD NAME

With the replacement of the old term, physical therapy, with the newer designation, "physical medicine," being accepted throughout the United States, doctors specializing in the field are wondering about what to call themselves. They are seeking a one-word term, which will convey the idea of the use of physical agents in the treatment of human ailments.

There has long been a tendency to refer to technical workers in the field of physical medicine as "physiotherapists" or "physical therapists," but recently the membership in the American Congress of Physical Medicine has been discussing a suitable designation for the physician who specializes in physical medicine.

Three names suggested are "physiatrist," "physiatrician" and physicologist." There has been expressed a preference for the first of these, "physiatrist." While the term may sound strange to the uninitiated ear, the term "physiatrics" is correct from the standpoint of word derivation, since it stems from pure Greek origins— "physis" being the Greek word for physical or natural phenomena, and "iatreia" referring to healing or healer. Therefore, a physiatrist would be a physician who employs physical agents.

Now that fellowships or residencies in physical medicine are being offered at the Universities of Minnesota, Pennsylvania, Harvard, New York, Ohio State and Kansas, as well as many other medical centers, a one-word term should designate physicians who have completed such fellowships.

UNIVERSITY RECEIVES $20,000 GRANT FOR PUBLIC HEALTH WORK

Public health research at the University of Minnesota recently received a grant of $20,000 by the federal security agency in Washington.

This will mean that Dr. Gaylord W. Anderson, director of the school of public health, will be able to complete research and editing of material on global epidemiology, the science of occurrence of disease, begun while serving in the medical intelligence division of the surgeon general's department in Washington.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

230 Lowry Medical Arts Bldg., Saint Paul, Minnesota

Julian F. DuBois, M.D., Secretary

Minneapolis Man Sentenced to Four-Year Term for Criminal Abortion

Re State of Minnesota vs. Elmer C. Hultgren

On May 17, 1946, Elmer C. Hultgren, thirty-eight years of age, 2900 37th Avenue South, Minneapolis, was sentenced to a term of not to exceed four years in the State Prison at Stillwater by the Hon. Lars O. Rue, Judge of the District Court. Hultgren, on the same date, had entered a plea of guilty to an information charging him with the crime of abortion. Hultgren was arrested on May 6, 1946, by the Minneapolis Police Department fol-

lowing a criminal abortion performed by him on a twenty-five-year-old married Minneapolis woman. The woman became ill and was admitted to Minneapolis General Hospital for treatment. Upon the recommendation of Mr. Brist, attorney for the Minnesota State Board of Medical Examiners, and Mr. Otto Morck, first assistant County Attorney of Hennepin County, Judge Rue ordered Hultgren to serve the first year of his sentence in the Minneapolis Workhouse after which time he will be placed on probation for a period of three years.

Hultgren has a previous conviction for practicing healing without a basic science certificate, having been convicted on September 21, 1944, in the District Court of Hennepin County for violating the State Basic Science Law, and on October 17 of that year, was sentenced to a term of one year in the Minneapolis Workhouse. Due to the fact that Hultgren was employed in an essential job in a Minneapolis war industry, he was required to serve only two months of that sentence. Hultgren was born in Chicago, Illinois, and has lived in Minneapolis for thirty years. He has no medical training of any kind and stated to the Court that a convicted abortionist was the person who first instructed him in the performing of abortions.

PHYSICIANS LICENSED NOVEMBER 9, 1945

October Examination

BERKMAN, David Scott, Med. Col. of Va., M.D. 1944, Mayo Clinic, Rochester, Minn.

BRONSON, Robert Glen, U. of Minn., M.B. 1944, M.D. 1945, Minneapolis General Hospital, Minneapolis 15, Minn.

BUSH, Robert Philips, U. of Pa., M.D. 1944, Mayo Clinic, Rochester, Minn.

CARPENTER, George Tyson, Northwestern U., M.B. 1944; M.D. 1945, Mayo Clinic, Rochester, Minn.

CARPENTER, Richard Everett, U. of Chicago, M.D. 1943, Mayo Clinic, Rochester, Minn.

CHRISTIANSON, Charles S., U. of Oregon, M.D. 1943, Minneapolis General Hospital, Minneapolis 15, Minn.

CONLEY, Francis William, U. of Iowa, M.D. 1943, Mayo Clinic, Rochester, Minn.

DAUT, Richard Victor, U. of Iowa, M.D. 1945, Mayo Clinic, Rochester, Minn.

DUNN, John Hartwell, U. of Tenn., M.D. 1941, Mayo Clinic, Rochester, Minn.

ELLIS, Franklin Henry, Jr., Columbia, M.D. 1944, Mayo Clinic, Rochester, Minn.

GEISER, Peter Micheal, Bowman Gray Med. Col., M.D., 1944, St. Mary's Hospital, Minneapolis, Minn.

HAGEN, Paul Stickney, U. of Minn., M.B. 1940; M.D. 1941, University Hospitals, Minneapolis 14, Minn.

HARE, Helen Jane, Rush Med. Col., M.D. 1942, Mayo Clinic, Rochester, Minn.

HENKEL, Herbert Bowman, St. Louis Univ., M.D. 1944, Mayo Clinic, Rochester, Minn.

HOLT, Robert Perry, U. of Okla., M.D. 1943, Mayo Clinic, Rochester, Minn.

JONES, John Robert, McGill U., M.D. 1943, Mayo Clinic, Rochester, Minn.

KENNEDY, Richard Loren, Rush Med. Col., M.D. 1935, 228 Lowry Medical Arts Bldg., St. Paul 2, Minn.

KRUSEN, Edward Montgomery, Jr., U. of Pa., M.D. 1944, Mayo Clinic, Rochester, Minn.

LEINASSAR, Jorma Michael, U. of Ore., M.D. 1944, Ancker Hospital, St. Paul 1, Minn.

LINDBERG, David Oscar Nathaniel, Boston Univ., M.D. 1915, Buena Vista Sanatorium, Wabasha, Minn.

LOWE, George Henry, Jr., Northwestern, M.B. 1942; M.D. 1943, Mayo Clinic, Rochester, Minn.

MACDONALD, Ian Donald, U. of Ore., M.D. 1944, Mayo Clinic, Rochester, Minn.

MacMUTRIE, Wm. Jos. Aloysius, Jr., U. of Pa., M.D. 1943, Mayo Clinic, Rochester, Minn.

McGUFF, Paul Edward, Ind. Univ., M.D. 1944, Mayo Clinic, Rochester, Minn.

MILLER, Edward Martin, Columbia U., M.D. 1944, Mayo Clinic, Rochester, Minn.

NELIMARK, Donald Robert, U. of Minn., M.B. 1945, Providence Hospital, Detroit 8, Mich.

SPRAY, Paul, Geo. Wash. U., M.D. 1944, Mayo Clinic, Rochester, Minn.

TAYLOR, Ashton B., Northwestern, M.B. 1944; M.D. 1945, Mayo Clinic, Rochester, Minn.

UPSHAW, Bette Young, U. of Texas, M.D. 1942, Mayo Clinic, Rochester, Minn.

WEED, Lyle Alfred, U. of Iowa, M.D. 1939, Mayo Clinic, Rochester, Minn.

WINCHESTER, Elsie Chilman, Rush Med. Col., M.D. 1942, Mayo Clinic, Rochester, Minn.

By Reciprocity

CLAYTON, Paul Algene, U. of Mich., M.D. 1942, Mayo Clinic, Rochester, Minn.

CRAIG, Marion Stark, Jr., U. of Ark., M.D. 1944, Mayo Clinic, Rochester, Minn.

DAVIS, William Irving, U. of Minn., M.B. 1939; M.D. 1940, Mound, Minn.

GILLILAND, Martha Jordan, U. of Louisville, M.D. 1941, Mayo Clinic, Rochester, Minn.

HAZEL, John Tilghman, Georgetown U., M.D. 1928, Mayo Clinic, Rochester, Minn.

LEAVITT, Milo David, Jr., U. of Pa., M.D. 1940, Mayo Clinic, Rochester, Minn.

MARSHALL, Helen Stewart, U. of Wis., M.D. 1942, Duluth Clinic, Duluth 2, Minn.

PARKER, Warren E., U. of Minn., M.B. 1934; M.D. 1935, Wadena, Minn.

POLLARD, William Henry, Jr., U. of Wis., M.D. 1942, 1300 University, Madison, Wis.

PRATT, Fred John, U. of Ark., M.D. 1944, Minneapolis General Hospital, Minneapolis 15, Minn.

SCHMIDT, Edward Carl, U. of Wis., M.D. 1940, Mayo Clinic, Rochester, Minn.

WOODWARD, Robert Samuel, Creighton U., M.D. 1943, Ancker Hospital, St. Paul, Minn.

National Board Credentials

FITZGIBBONS, Robert Joseph, Creighton U., M.D. 1943, Mayo Clinic, Rochester, Minn.

GLYNN, James Joseph, Col. of P. & S., N. Y., M.D. 1943, Mayo Clinic, Rochester, Minn.

HARTIGAN, John Dawson, Creighton U., M.D. 1943, Mayo Clinic, Rochester, Minn.

HENDERSON, Edward Drewry, U. of Minn., M.B. 1943; M.D. 1944, Mayo Clinic, Rochester, Minn.

LE BLANC, Leo James, St. Louis U., M.D. 1941, Mayo Clinic, Rochester, Minn.

Minneapolis Surgical Society

Meeting Held January 7, 1946

in conjunction with the Hennepin County Medical Society

The President, Robert F. McGandy, M.D., in the chair

SECTION OF THE VAGUS NERVES TO THE STOMACH IN THE TREATMENT OF GASTRO-DUODENAL ULCER

LESTER R. DRAGSTEDT, M.D., Ph.D.
Professor of Surgery, The University of Chicago
Chicago, Illinois

I am highly honored to be invited back to Minneapolis and especially, to speak to you once again on the same subject that I had the pleasure of presenting some eight years ago. I feel that I am "carrying coal to Newcastle" to talk about peptic ulcer in Minneapolis, where so many fundamental observations in this field have been made. I have in mind, the splendid work done by Dr. Wangensteen and his associates at the University of Minnesota.

During the past three years, I have sectioned the vagus nerves to the stomach as a method of treatment in fifty-four patients with various types of peptic ulcers. I should like to emphasize the point that the first operation was done just three years ago and the remainder, in the intervening period. This is too short a time to draw final conclusions concerning the value of any therapeutic measure in this disease. This discussion, therefore, must be considered in the nature of a progress report.

Division of the vagus nerves to the stomach has been accomplished above the diaphragm by a transthoracic approach and immediately beneath the diaphragm by an approach through the abdomen. In the transthoracic operation, it has been my practice to make an incision as indicated in Figure 1*a*. The eighth rib on the left side is widely resected (Fig. 1*b*), and the left pleural cavity is entered through the bed of the eighth rib. The inferior pulmonary ligament is divided and the left lung retracted superiorly. The pleura, over the lower 4 inches of the esophagus, is incised, the lower end of the esophagus mobilized by gentle finger dissection and lifted up into the pleural cavity. The diaphragm is held down with a retractor. It is not necessary to section the phrenic nerve. The vagus trunks are easily identified by palpation and dissection as indicated in Figure 2. While there is often considerable variation in the arrangement of the vagus fibers, in most cases they may be identified as two main trunks at the region of the lower esophagus. The left vagus is found somewhat anterior to the esophagus and extends to the lesser curvature of the stomach. The right vagus is posterior to the esophagus and is brought out to the left of the esophagus by finger dissection. There is usually one large communicating branch between the right and left vagus, as indicated in the drawing. Occasionally several additional vagus fibers are found in the wall of the esophagus and these are

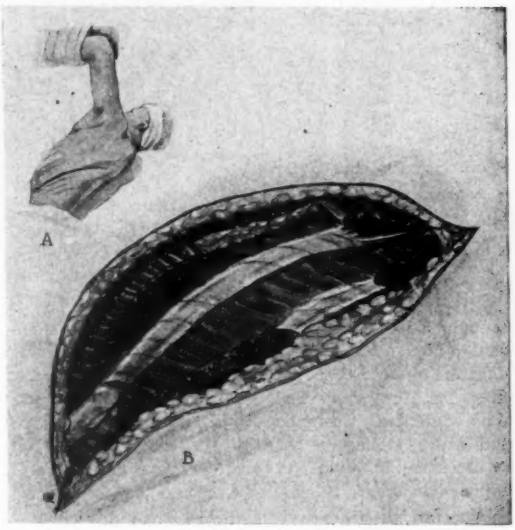

Fig. 1.

easily detected by palpation and dissected free from the esophagus with the finger. The vagus nerves are ligated with silk just above the diaphragm and divided. The distal ends are permitted to retract into the abdomen and the proximal ends are brought out into the left pleural cavity and sutured to the pleura (Fig. 3*a* and *b*). The purpose of this maneuver is to hinder regeneration. The esophagus is then gently placed back in its bed and the pleura closed with a running catgut stitch. The chest is usually closed without drainage.

In the operation of trans-abdominal vagus section, a left upper paramedian incision has been made as indicated in Figure 4*a*. The ligament to the left lobe of the liver is divided and the left lobe of the liver retracted to the right (Fig. 4*b* and *c*). The peritoneum, covering the lower esophagus is then incised and the esophagus mobilized by blunt finger dissection. It is usually possible to pull the esophagus downward into the abdominal cavity sometimes for a distance of two to three inches. When this is done, it is possible to pick up the right, or posterior vagus nerve as it lies back

of the esophagus and the left, or anterior vagus nerve as it extends downward to the lesser curvature of the stomach (Fig. 5*a* and *b*). These nerves are then tied with silk as high as possible, divided and the distal ends

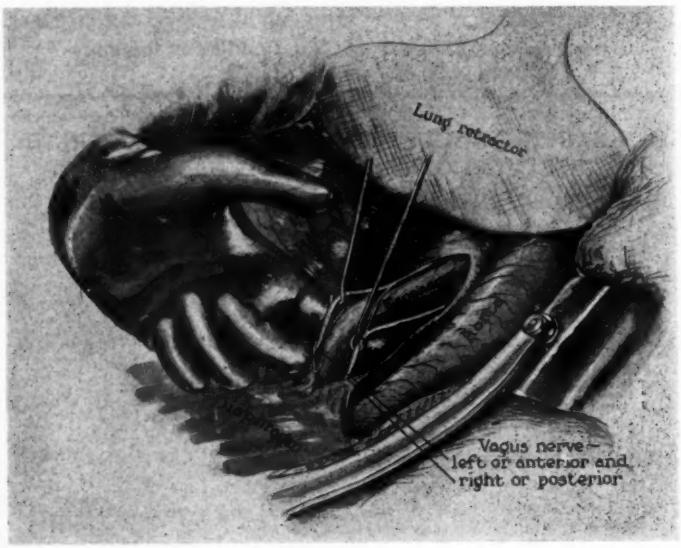

Fig. 2.

brought down and buried in the serosa of the stomach, (Fig. 6*a* and *b*). While it is perhaps more difficult to secure a complete section of the vagus fibers to the stomach by the abdominal approach, this can be accomplished if the esophagus is sufficiently mobilized. As will be indicated later, it is necessary to divide all of the vagus fibers to the stomach to secure a successful result.

What are the theoretical considerations that prompted us to undertake this type of operation as a method of treatment for peptic ulcer? It is not possible in the time at my disposal to present a review of the present status of our knowledge concerning the pathogenesis of peptic ulcer. A part of this data was presented on the occasion of my former lecture. I believe that we know a good deal about the cause of peptic ulcer. The alterations in the physiology of the gastro-intestinal tract which regularly lead to the production of ulcers and maintain their chronicity are well understood. Factors which will permit these experimental ulcers to heal are also recognized. Pure gastric juice as it is secreted by the glands in the fundus of the stomach has the capacity to destroy and digest all living tissue including the wall of the duodenum and of the stomach itself. Many types of experiments have been devised to demonstrate this central fact. Under normal conditions, the gastric wall is not digested away because it is not exposed to pure gastric juice for any considerable period. The stimulus which calls forth the secretion of gastric juice under normal conditions, is the ingestion of food and it is this food which is the chief factor that dilutes and neutralizes the gastric juice and protects the wall of the stomach against its corrosive action. Mann and Williamson demonstrated many years ago that the alkaline juices of the duodenum also exert a protective action against the corrosive effect of the gastric

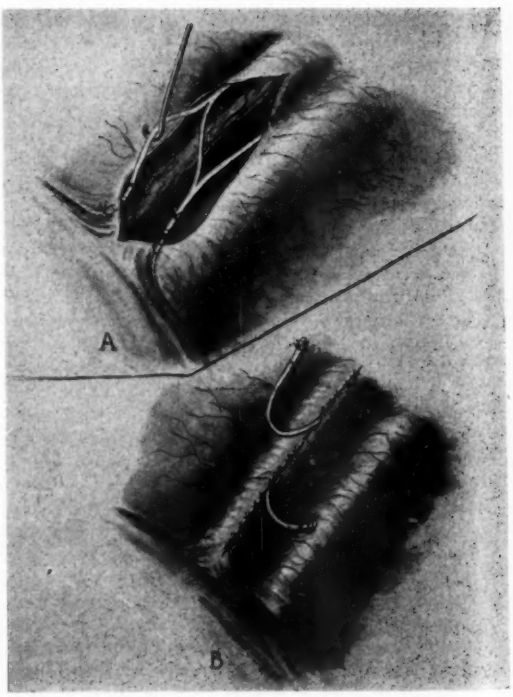

Fig. 3.

juice and this factor is obviously of great importance in reducing the acidity of gastrc juice that is secreted in the empty stomach in the intervals between meals, the so-called continuous secretion. Peptic ulcer, however, occurs for the most part in young and healthy adults in whom there is no evidence that a deficiency in the secretion of bile or pancreatic juice exists or any failure of these secretions to reach the duodenum. If, however, it be conceded that the alkaline juices of the duodenum remain normal in amount and quality, an excessive secretion of gastric juice should produce the same effect as would a withdrawal of the duodenal secretions in the presence of a normal gastric secretion. That an excessive secretion of normal gastric juice in the empty stomach will produce ulcer was clearly demonstrated by Wangensteen, Varco and their associates in this city when this excessive secretion was produced by the implantation of histamine in beeswax in the subcutaneous tissues. As will become evident later on in this lecture, we now have abundant evidence that an excessive secretion of gastric juice occurs in most patients with peptic ulcer, that this secretion is neurogenic in origin and is not dependent upon the stimulus of food.

In general, the medical treatment of ulcer has been successful depending upon the degree to which the physician has been able to neutralize the acid in the gastric secretion during the entire 24-hour period. In the surgical treatment of ulcer of the stomach, results have been likewise successful, directly depending upon the success of the surgeon in reducing the amount of gastric juice produced by removing an adequate amount of the secreting portion of the stomach.

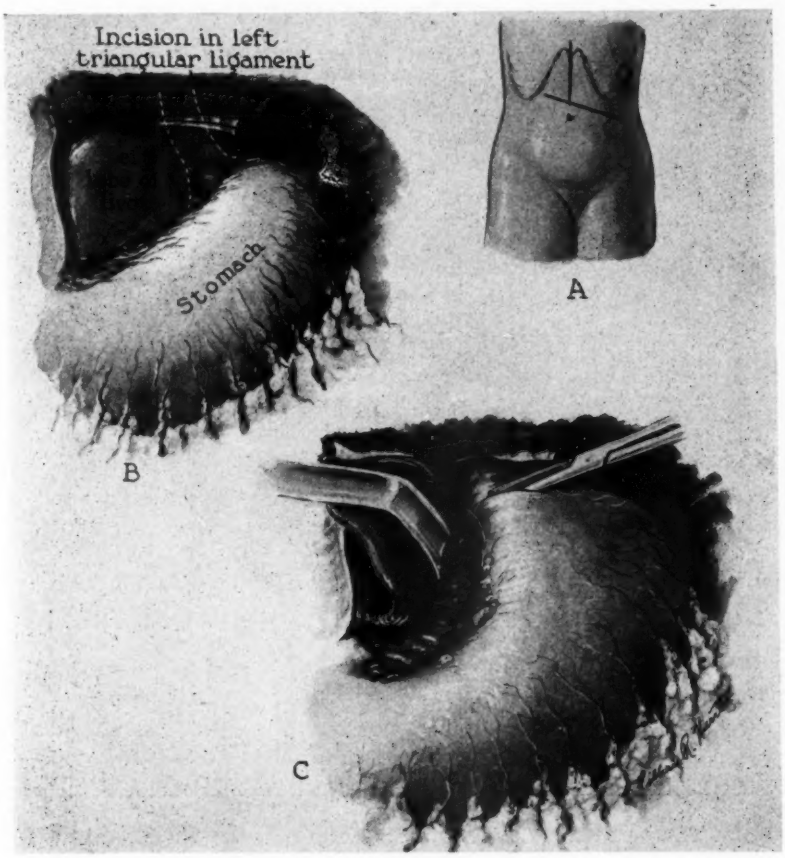

Fig. 4.

In the interval between meals, the gastric glands are not quiescent, as Beaumont and Pavlov imagined. The observations of A. J. Carlson proved that a continuous basal secretion of gastric juice is a normal phenomenon in both man and experimental animals. In our observation, this continuous secretion amounts to approximately 300 c.c. during a twelve-hour period when the individual is asleep at night and there is no food in the gastro-intestinal tract. This continuous secretion of gastric juice is markedly augmented by the ingestion of food. The taste of food, and to a certain ex-

tent also the sight and odor of food, provokes a secretion of gastric juice that is neurogenic in origin. It is dependent upon a conditioned reflex which excites the gastric secretory fibers in the vagus nerves to the stomach. This information has come to us from the classical experiments of Pavlov and his pupils. Division of the vagus nerves to the stomach, which removes this neurogenic phase of gastric secretion does not stop the secretion of gastric juice in the stomach as Pavlov supposed. On the contrary, a secretion of gastric juice occurs so long as food is present in the stomach or in the upper intestine. This secretion is due to the liberation of gastrin from the wall of the stomach and duodenum. It is produced by the presence of food and its formation ceases when the stomach and intestines become empty. We have, at the present time, no very accurate data with respect to the normal amount of gastric juice that is secreted by man in a twenty-four hour period. There seems to be no way to subject the stomach to the normal stimulus of food and collect the secretory product. There is, likewise, no precise information concerning the proportion of gastric secretion that is due to neurogenic stimulation and the amount that is brought about by the gastrin or hormone mechanism. Knowledge concerning the chemical stimulation of the gastric glands has come about largely as a result of the work of American physiologists. It is possibly due to this fact that our attention has been so largely focused on this chemical mechanism and consequently, chemical types of stimuli such as histamine or alcohol have been used almost exclusively to test the secretory function of the stomach in health and disease.

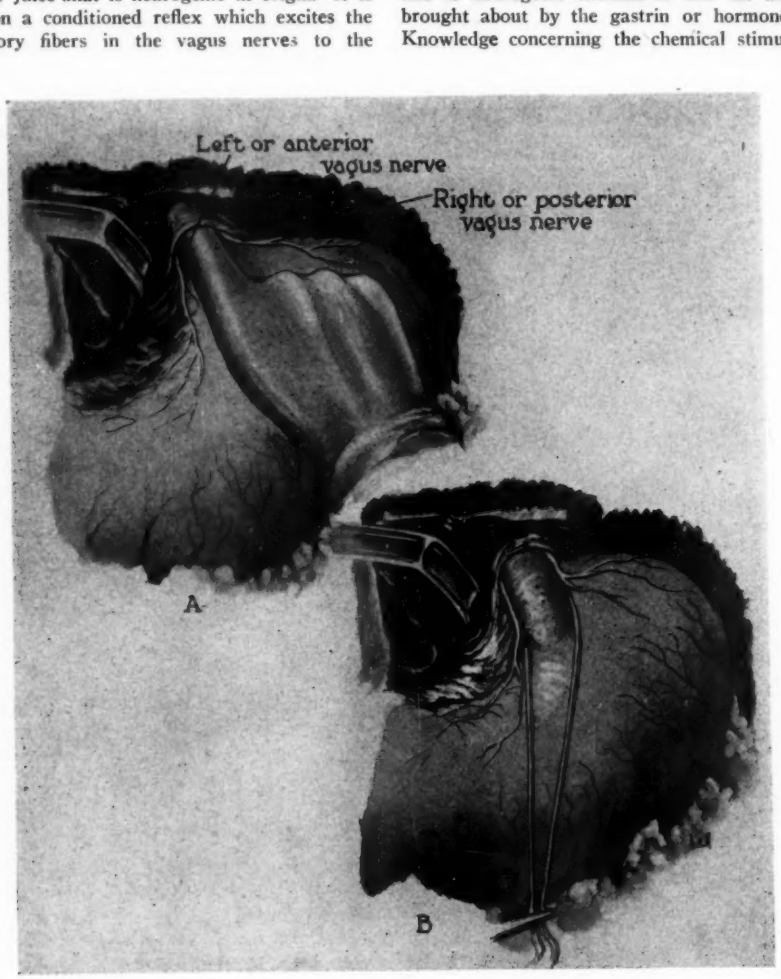

Fig. 5.

In an attempt to secure information concerning the relative importance of vagus nerves in the secretion of gastric juice, we performed an experiment of the type illustrated in Figure 7. The stomach was transected at the cardia and at the pylorus and the ends infolded and closed. The lower end of the esophagus was anastomosed to the duodenum or implanted into the jejunum. Care was taken not to interfere with the vagus nerve supply to the stomach or with its blood vessels. After recovery from such an operation, food passes

directly from the esophagus into the intestine and no food enters the stomach. Nevertheless, the isolated stomach in such an experiment will secrete from 1,000 to 2,500 c.c. of highly acid gastric juice in a twenty-four-hour period which may be collected by a suitable cannula. The loss of this amount of gastric juice produces a rapidly fatal hypochloremia, alkalosis and dehydration. This must be compensated for by the daily intravenous ingestion of adequate amounts of physiological salt solution. If the vagus nerves to such an isolated stomach are divided, the secretion of gastric juice falls off to an average of 300 to 600 c.c. per twenty-four hours and with this decreased gastric secretion, the parenteral administration of salt solution may not be required. It is thus evident, that in the normal dog, the vagus nerves are the most important factor in determining the volume and acidity of the gastric secretion. These were among the theoretical considerations which led us to attempt total section of the vagus nerves to the stomach as a method of treatment for peptic ulcer.

What have been the results of this operative procedure to date? The total number of patients operated upon is fifty-four. Of these fifty-four patients, one died from aspiration pneumonia, making a mortality of about 2 per cent. In thirty-nine patients, the vagus nerves were divided above the diaphragm by a transthoracic operation; in the remaining fifteen, section of the vagus nerves was made beneath the diaphragm through a transabdominal incision. Two patients had large chronic gastric ulcers and had been observed in our Gastro-intestinal Clinic for four and five years, respectively. Although x-ray and gastroscopic examination indicated that these ulcers were benign, resection of the stomach was advised but refused. Following supra-diaphragmatic section of the vagus nerves, both of these ulcers healed as determined by x-ray and studies. Eight of the patients had gastro-jejunal ulcers and of these, two followed gastro-jejunostomy, and six followed subtotal gastrectomy. Forty-four patients had duodenal ulcers, many associated with high grade cicatricial stenosis of the pylorus, repeated severe hemorrhages, or were in general, intractable to medical management. In all patients, gastric decompression with an indwelling tube was carried out for the first four days following vagus section. This is a matter of the greatest importance since

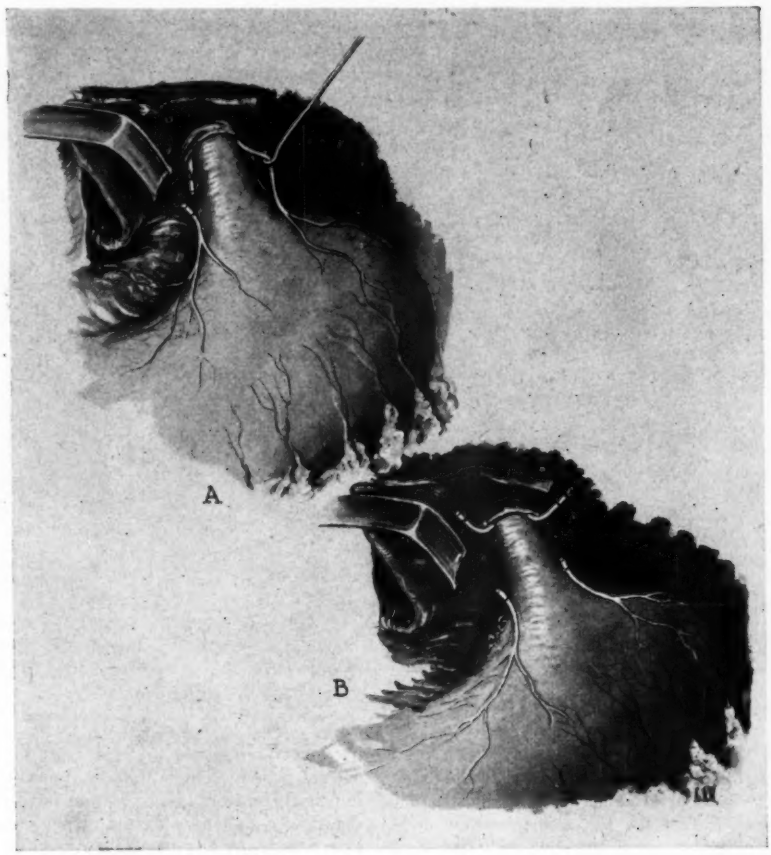

Fig. 6.

a profound depression in the tonus and the motility of the stomach occurs immediately following the operation which in the presence of pyloric stenosis may result in an acute dilatation of the stomach. All of the patients

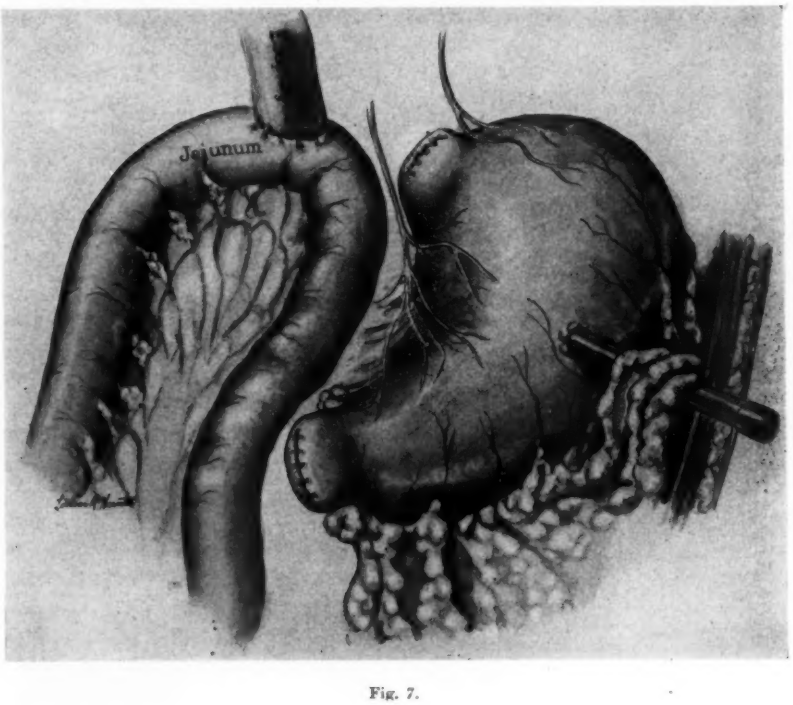

Fig. 7.

were mobilized the day following operation. As a rule, no dietary restrictions were prescribed when feeding was instituted on the fifth or sixth day, and all medication was discontinued. Except for one woman with a duodenal ulcer in whom subsequent testing indicated that a complete vagotomy was not secured, the result has been immediate, complete and permanent symptomatic relief, gain in weight, and in most cases objective evidence of healing of the ulcers. There have been no recurrences to date, no hemorrhages and no perforations. Fifteen of the patients required gastro-enterostomy at the time of the vagus section or subsequently because of cicatricial pyloric stenosis. One patient with a jejunal ulcer following gastric resection, continued to display obstructive symptoms and a subtotal resection subsequently was done elsewhere. In this case, I have been informed by Dr. Warren Cole who performed the operation that the residual symptoms were due to obstruction and not to persistence of an ulcer which had healed.

During the course of this study, some observations have been made on the secretory and motor function of the human stomach, before and after total vagus section, that are of considerable interest. For the most part, it has been customary to determine the gastric secretory response of ulcer patients to some type of humoral stimulus and compare this response with that obtained from normal individuals. The stimuli usually employed have been histamine or alcohol. In general, it may be said that ulcer patients secrete a little more gastric juice in response to these types of stimuli than do normal people. The difference, however, has not been sufficiently uniform and great to have much diagnostic significance and as a result, many gastro-enterologists have abandoned this type of examination. A determination of the secretion of the empty stomach in the absence of any known stimulus gives promise of being more useful both from the standpoint of diagnosis and prognosis. The early view of Beaumont and Pavlov, that in the intervals between meals the gastric glands are quiescent, has been shown to be incorrect by the extensive studies of A. J. Carlson. He has found that a continuous basal secretion of gastric juice is a normal phenomenon in both animals and man. The cause of this continuous secretion in normal individuals is unknown. It can best be determined by washing out the stomach at 9 o'clock in the evening and then maintaining constant suction by means of an indwelling tube connected with a Wangensteen apparatus. Aspiration is continued for twelve hours, until 9 o'clock the following morning. In nine patients with carcinoma of the stomach, in whom this examination was made, the continuous twelve-hour night secretion averaged 260 c.c. with a free acidity of four clinical units. In five patients with carcinoma of the colon, an average night secretion of 238 c.c. was obtained with a free acidity of nine clinical

units. In six patients with cholelithiasis, an average of 385 c.c. of continuous secretion was secured with a free acidity of six clinical units. In sharp contrast to these findings, in ten patients with duodenal ulcer, an average night secretion of 821 c.c. was found with a free acidity of forty-seven clinical units. In other words, patients with duodenal ulcer were found to secrete from two to three times as much gastric juice as do normal individuals when there is no known stimulus applied to the gastric glands. In our experience, this has been a uniform finding, not only with respect to patients with duodenal ulcers, but also in patients with gastric ulcers. The chief secretory abnormality in ulcer patients is therefore, not that they secrete more gastric juice in response to the stimulus of histamine or alcohol but rather that they secrete large volumes of highly acid gastric juice in the empty stomach in the absence of extraneous stimulation. It is very significant that this abnormally large continuous secretion decreased to the levels found in normal individuals after complete section of the vagus nerves. This finding proves that the excessive secretion of gastric juice in ulcer patients is neurogenic in origin.

These findings are in harmony with the concept that duodenal ulcer is a psychosomatic disease. It is now well established that the incidence of ulcer is especially high in those individuals whose occupations subject them to great stress and strain and that exacerbations in ulcer patients are particularly apt to occur during periods of emotional stress. Several years ago, Harvey Cushing summarized the evidence implicating the central nervous system in the genesis of ulcer. He suggested that peptic ulcer depends upon some disturbance or disease in the midbrain. Of the possible ways in which the central nervous system could affect the gastro-intestinal tract the most likely avenues would appear to be by way of the extrinsic nerves, the vagi and the splanchnics. The evidence that we have secured indicating that an excessive secretion of gastric juice of nervous origin occurs in most, if not in all, ulcer patients, coupled with the demonstration in the experimental laboratory, notably by Dr. Wangensteen and his associates, that an excessive secretion of gastric juice experimentally induced will regularly produce ulcers in the stomach and duodenum makes it seem most probable that the midbrain plays its rôle in ulcer genesis through excessive secretory nerve impulses conveyed to the stomach over the vagus nerves. Such an explanation is more in harmony with the data obtained from experimental studies on the patient genesis of ulcer than the concept that the central nervous system produces ulcer in the stomach by producing local areas of vaso-constriction or of trophic disturbance.

I should now like to call your attention to a method of stimulating gastric secretion that is of great significance in connection with the operation of vagus section for the treatment of ulcer patients. It is very evident that all of the vagus fibers to the stomach must be divided, that the vagotomy must be complete or a beneficial result cannot be expected. Do we have any method for determining if all of the secretory fibers of the vagus nerves to the stomach have been excluded? The administration of 20 to 30 units of insulin in the fasting state produces a marked hypoglycemia. This hypoglycemia in turn, stimulates the vagus centers and causes a secretion of gastric juice in the stomach. This secretion is entirely abolished if the vagus section has been complete. In making this test, it has been our custom to fast the patient for twelve hours and then give a subcutaneous or intravenous injection of 20 units of regular insulin. A preliminary determination of the blood sugar is made. The gastric content is aspirated at ten-minute intervals and its volume and free acidity determined. Forty-five minutes after the injection of insulin a second determination of blood sugar is made to determine the extent of the hypoglycemia. If the blood sugar does not fall to 30 mg. per cent, a maximum stimulation of the gastric glands will not be secured. If the vagus nerves are intact, an increase in gastric secretion is regularly found forty to fifty minutes after the subcutaneous injection of the insulin. If the vagus section has been satisfactory, no increase in secretion in response to the hypoglycemia will be found.

The motility of the empty stomach in our ulcer patients has been studied by the balloon technique and the contractions recorded by means of a manometer and Kymograph. As a result of these studies we have confirmed the observations of previous investigators that the motility and tonus of the fasting stomach in ulcer patients is greater than in normal individuals. Following section of the vagus nerves, there occurs a profound inhibition in the tonus and motility of the stomach which is most marked for the first two or three days after the operation and which gradually returns toward the levels found in normal individuals. It is important to emphasize that neither the tonus nor the contractions of the empty stomach are abolished by sectioning the vagus nerves. The profound decrease in gastric tonus, however, in the immediate postoperative period makes it highly important to decompress the stomach by means of the Wangensteen suction apparatus. If this is not done, an acute dilatation of the stomach may result. It has been my experience that after three or four days of such decompression the motility of the stomach has recovered sufficiently to permit normal emptying if cicatricial obstruction is not present.

In concluding these remarks, I should like to emphasize that our first patient was operated upon just three years ago and the remainder in the intervening period. This is obviously too short a time to permit us to draw final conclusions with respect to the value of vagus section as a therapeutic measure. The results to date, however, have been so satisfactory that I feel justified in making the following provisional conclusions: Transthoracic supra-diaphragmatic section of the vagus nerves is recommended as a substitute for subtotal gastrectomy for duodenal ulcers in the absence of cicatricial stenosis of the pylorus; gastrojejunal ulcers and for gastric ulcers where the diagnosis is certain. Trans-abdominal vagus section plus gastro-enterostomy is recommended for duodenal ulcers with cicatricial pyloric stenosis. So far, we have not encountered recurrent or stomal ulcers in patients who have had a vagus section and a

gastrojejunostomy. I do not believe that such ulcers are apt to occur since section of the vagus nerves in patients with established gastrojejunal ulcers has caused these ulcers to heal. If a jejunal ulcer will disappear as a result of the vagus section it seems to me that we are justified in believing that in all probability a new jejunal ulcer will not develop. A longer period of observation and a more extensive series of patients are obviously necessary to provide final answers to many of these questions.

Discussion

DR. MAURICE VISSCHER.—It is a privilege to be able to make some remarks in connection with the excellent paper that Doctor Dragstedt has just presented. I would suggest first that one of the statements which our chairman has made in introducing Doctor Dragstedt is perhaps incorrect; namely, that Doctor Dragstedt deserted physiology to go into surgery. I would say rather that he utilizes surgery to further physiology.

The first thing I would like to say is that the observations that Doctor Dragstedt has made in this series of clinical studies on fifty-four patients on whom he has performed vagotomy at the level of the lower esophagus have provided us with a great deal of very useful physiological information, particularly in connection with the influence of the vagus on the motility of the stomach in humans, information which we simply could not have gotten in any other way.

In that connection I might remark that every one who has thought about Doctor Dragstedt's interesting surgical experiments has wondered whether or not the motility changes might be so great as to make the operation impractical. He has shown us that there is in the gastric ulcer patient ordinarily an increased gastric motility, and I wonder whether perhaps the fact that he worked with patients in which there is already an imbalance between the factors controlling motility, in favor of increased motility, may not be the reason why he has been able to remove the vagal factor without producing an atonic condition which persists over a long period of time and does damage. Perhaps there is something in the way of a fundamental disability which is corrected by removal of the vagal factor which would not indicate that in the normal subject one could perform the vagotomy with the same impunity. I would like Doctor Dragstedt's comment upon that.

The very beautiful observations on the rôle that the vagus nerve fibers play in controlling the interval secretion has also added an important new set of facts to physiology. It is rather surprising that one would find the interval secretion in the absence of the vagus fibers to have as much lowering of acid as Doctor Dragstedt has found. A few years ago Doctor Varco and Doctor Lifson and I were interested in the problem of gastric acidity in relation to what we might call the neutralizing factor. We ran onto some rather interesting observations in study of osmotic pressure of the gastric juice. It is ordinarily supposed that the gastric secretion is isotonic with the plasma. This is a matter of fact, slightly incorrect, as most acid gastric juices are a little hypertonic. Further, in those animals in which the gastric juice after histamine possessed low acidity, it was found to be quite definitely hypotonic. This we interpreted as being due to neutralization of two components, alkali and acid with loss of some osmotically active particles. Sodium chloride and hydrochloric acid upon neutralization end up with fewer particles and lower osmotic activity. There are some animals in which that mechanism does not exist. So far as we know, this problem has not been studied from the clinical point of view at all. It might be worth while to study the osmotic activity of gastric juice in relation to peptic ulcer and the presence and absence of an internal neutralizing mechanism in the gastric juice.

I would like to point out one further implication of the general physiological aspects of Doctor Dragstedt's studies. He has attacked one of the mechanisms by which the amount and acidity of gastric juice can be influenced. There are other physologic mechanisms by which the gastric secretion in quantity and quality could be influenced. I point out that the road is still open for physiological studies such as those for example that Doctor Dragstedt's former collegue Doctor Ivy is carrying on in connection with the action of chemical agents such as enterogastrone, whose use involves much less drastic procedures than gastrectomy or even vagotomy. Obviously we would prefer some chemical means of bringing about a result in preference to a surgical procedure.

DR. MOSES BARRON.—We are to be congratulated on having had the opportunity of listening to a paper which combines the results of the knowledge and technique of a great surgeon and the keen thinking ability of a physiologist. The presentation here this evening shows what can be done when one has the basic fundamental knowledge of how to approach problems, and in this case, a very important problem, as we all know. All of us who are in practice know how common a condition ulcer is and the recent literature shows that during the last war in the British Army, gastro-intestinal upsets were very common, known as dyspepsias, and of these, about 55 per cent were shown to be ulcers. Similarly, in the German Army, about 33 per cent of so-called dyspepsias were ulcers, and in the American Army, though much less, 10 to 15 per cent of those complaining of gastro-intestinal distress proved to have peptic ulcers. These conditions were serious problems in the armed forces.

You can see, therefore, that the problem which Doctor Dragstedt is trying to solve is a very important one. As an internist, of course, I feel that the problem is still far from solution, and it is my opinion that the treatment of peptic ulcers is a medical and not a surgical problem. Doctor Wangensteen here knows well my stand on this. It is my opinion that only when there are complications to the peptic ulcers, such as recurrent hemorrhages, obstruction or perforation, is surgery to be considered. Even in obstruction the treatment is often medical unless it is due to scars and cicatrices. Very often it is due to spasm which responds to medical management. Perforation, of course, is always surgical. Repeated hemorrhages, especially in older people where the vessels are often sclerotic, call for surgical interference.

It has now been well established that the acid-pepsin factor is the most important one in the continuation of ulcers. This idea is well illustrated by the fact that practically no one has seen a chronic ulcer develop in a case of pernicious anemia because there is achlorhydria present. One day while making rounds at the General Hospital, I was told that there was a patient in the ward with pernicious anemia in whom gastroscopy showed the presence of an ulcer. However, that ulcer was asymptomatic and required no treatment. Superficial ulcers in the stomach are probably frequent, but they heal and do not become chronic if acid and pepsin are not present in excess.

The problem in ulcer management is how to get rid of or greatly reduce the acid secretion. In the literature it is often stated by some authorities that from 30 to 40 or even 50 per cent of medically managed ulcers have recurrences. This may be true, but it is not necessary. You cannot treat an ulcer like you do pneumonia. Doctor Dragstedt has pointed out that there is a strong psychosomatic factor in ulcer patients. For this reason it is essential to treat this factor and to go into great detail in explaining to the patient just what one tries to do by the management. If that is done and if a proper regimen is established, by far the great majority of the

patients will become entirely free from symptoms within a very short time and will remain symptomatically cured without recurrence. In my experience this method has proved very satisfactory.

In those cases where surgical procedures are indicated, we want, of course, the simplest ones to be used, and Doctor Dragstedt apparently has reported on a relatively simple procedure. In his series, his mortality rate was 2 per cent and postoperative convalescence was not prolonged. The question is, of course, what is the final outcome? If my memory is correct, Doctor Dragstedt stated that 7 cases had to be followed with gastro-enterostomy in his series of fifty-four cases after the vagotomy. This makes about 15 per cent of recurrence of symptoms. That is rather high. A number of different procedures have been devised for surgical management. I have been told by some surgeons that gastro-enterostomy is not satisfactory because of the subsequent development of jejunal ulcer in quite a percentage of cases. It is possible that Doctor Dragstedt's vagotomy may reduce the secretion enough to prevent this complication. Of the gastric resections, some have not been satisfactory. Recurrences of ulcers have been reported. From the physiological point of view, it would therefore, seem that to get the best results, a subtotal resection should be done since this would remove most of the acid-forming tissue. Doctor Dragstedt stated that even after vagotomy, secretory stimulating substances like caffein would stimulate secretion about as much as before the vagus section. We know also that certain foods cause strong stimulation of the secretion by acting directly upon the secreting cells. Vagotomy, therefore, will remove only part of the factors which produce excessive acid.

As the essayist himself has stated, we do not know what will happen in four or five years following the operation. No definite conclusions, therefore, can as yet be drawn. He showed in his slides that there is a large quantity of secretion in the stomach in cases of duodenal ulcer, and yet two weeks after his operation, the quantity of secretion is much less and the acidity is less. I am wondering whether the same result would not be obtained if any operation had been performed on the patient, such as appendectomy. Has he checked the results of the acid secretion following other types of operations? It is possible that the mere act of operation and keeping the patient confined to bed may cause a reduction in the quantity and acidity of the secretion. Doctor Dragstedt probably will enlighten us later on this phase of the problem, but we are very grateful to him for taking such an interest in one of our great problems, that of peptic ulcer, and I personally would like to thank him for this evening's presentation.

DR. OWEN WANGENSTEEN.—This has been a typical Lester Dragstedt performance of a high order of excellence, and I count it a real pleasure to have had the opportunity of hearing Doctor Dragstedt's fine presentation. When one takes the pains to enumerate the known agencies through which gastric secretion may be inhibited, vagotomy stands high on such a list. Long ago, Pavlov demonstrated that bilateral vagotomy did away with the cephalic phase of gastric secretion for good and all. Doctor Dragstedt suggests, moreover, that the interdigestive basal gastric secretion, in patients with duodenal ulcer at least, may be "neurogenic" in origin. A number of published reports indicate that the "night secretion" of patients with duodenal ulcers may be reduced considerably with atropine. That is, a drug such as atropine, which inhibits the transmission of vagus mediated influences, will reduce the volume as well as the acidity of the gastric juice appreciably in the interdigestive phase. My associate, Doctor Fred Mears (Surgery 13:214-23, 1943) studied this item in our clinic and found that the influence of atropine in decreasing gastric secretion in ulcer patients was real. However, one consideration deterred us from taking the bold step which Doctor Dragstedt has described. Hartzell (1929) took up the study of the effect of vagotomy upon gastric secretion for his Master's thesis under Doctor Frank Mann's direction. You will recall that Hartzell sectioned the vagi nerves below the diaphragm in some dogs and above it in others. The period of study after vagotomy in Hartzell's dogs was five months. He noted a reduction in gastric secretion, particularly in the dogs in which the vagi nerves had been cut above the diaphragm. However, Vanzant (1932) restudied the remote results of vagotomy in four of Hartzell's eight dogs more than two years after the vagotomies had been done. At that time, Vanzant noted that the depressing effect of vagotomy had been lost. She failed to find any evidence of regeneration of the vagi nerves at autopsy. Vanzant stated that Pieri and Tanferna observed that the depressing effects of vagotomy upon gastric secretion in man were not permanent. On the basis of reports such as Vanzant's (1932), it might be well to reserve judgment with reference to the late results of vagotomy upon gastric secretion until a few more years have elapsed.

Another deterrent to ready acceptance of vagotomy as a satisfactory operation for ulcer has been the occurrence of pyloric obstruction. Possibly this is a more frequent sequel of vagotomy in the dog than in man. My associate, Doctor Carroll Bellis (1939, unpublished observations) noted dilatation of the stomach accompanied by an increase in thickness of the gastric wall after vagotomy in dogs. Vomiting was not infrequent. Scharpy-Schaefer already had made a similar observation approximately twenty years before. Doctor Dragstedt's associate, Doctor Phemister, also has reported some delay in gastric emptying in esophago-gastric resections for esophageal cancer, owing to incidental bilateral vagotomy. It is reassuring to learn that vagotomy apparently does not reduce appetite for food.

Doctor Dragstedt has indicated that a complemental or supplemental gastrojejunostomy has been found necessary in about 15 per cent of patients undergoing vagotomy for ulcer. Montgomery (1923) has shown that gastrojejunostomy in the dog is followed by ulcer in about 6 per cent of instances. Normally the dog, unlike man, is quite immune to spontaneously occurring ulcer—a circumstance attested to by both Mann and Ivy. Doctor Dragstedt himself, I believe, is responsible for the suggestion that gastrojejunostomy for duodenal ulcer in man is followed by gastrojejunal ulcer in approximately 40 per cent of the patients. It is important to know, therefore, whether the depressant effects of vagotomy upon gastric secretion are lasting.

Beaver and Mann (1931) failed to observe that vagotomy protected against the Mann-Williamson provoked ulcer. In only one of nine dogs after diversion of the bile and pancreatic juice to a lower level, did vagotomy obviate the occurrence of stomal ulcer. Moreover, my associates, Doctors Ivan Baronofsky and Stanley Friesen (1945, unpublished observations) failed to note any protection against the histamine-provoked ulcer after vagotomy in the dog and rabbit.

It has been profitable and stimulating to have Doctor Dragstedt here, and those of us who have a special concern in the subject will follow his observations with the keenest interest.

DR. LESTER R. DRAGSTEDT: I should like, first of all, to express my sincere thanks and appreciation for this friendly and informative discussion. I am quite sure that in this operation, we do not have the final answer to the ulcer problem. If peptic ulcer is a psychosomatic disease and arises as a result of the tension and strain of modern competitive life then I quite agree that there ought to be some more fundamental way of treating the essential disorder. As you know, there have been occasional attempts to treat peptic ulcer with various types of psychotherapy. I should like to point out to those physicians interested in this field that we have now objective evidence of the nervous disorder at the basis of

(Continued on Page 618)

Minnesota Academy of Medicine

Meetings of February 13 and March 13, 1946

February 13, 1946

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, February 13, 1946. Dinner was served at 7 o'clock and the meeting was called to order at 8 o'clock by the President, Dr. S. E. Sweitzer.

There were forty-five members and one guest present.

Minutes of the January meeting were read and approved.

Dr. J. A. Lepak, chairman of the Committee on Revision of the Constitution, stated that the committee has been working very hard to revise the constitution and bring it up to date and also the Articles of Incorporation of the Academy. It is necessary to revise the Constitution in order to conform to the statutes of the State of Minnesota. When this work is completed the Articles of Incorporation will be presented to the members for discussion and disposal.

The scientific program followed.

Dr. L. H. Fowler, Minneapolis, as his Inaugural Thesis, gave a lantern slide talk in color on "Surgical Experiences in England, Africa and Italy" with Base Hospital No. 26.

The meeting adjourned.

A. E. CARDLE, *Secretary*

March 13, 1946

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, March 13, 1946. Dinner was served at 7 o'clock and the meeting was called to order at 8 o'clock by the President, Dr. S. E. Sweitzer.

There were fifty-three members and three guests present.

Minutes of the February meeting were read and approved.

Dr. Lepak, chairman of the Committee on Revision of the Constitution and incorporation of the Academy, then reported for his committee, and the changes made in the present constitution and by-laws, principally with regard to the election of new members. A motion was made and seconded that these changes be adopted, and upon vote the motion was carried. Dr. Lepak also showed the picture of the new Seal of the Academy.

A motion was carried that Dr. Lepak and his committee be given the thanks of the Academy for his arduous work in connection with the incorporation of the Academy and the revision of the Constitution.

The scientific program followed.

MULTIPLE MYELOMA

Report of a Case

JOHN A. LEPAK, M.D.
Saint Paul, Minnesota

Ewing defines multiple myeloma as a specific malignant tumor of the bone marrow arising probably from a single cell type, and characterized chiefly by multiple foci of origin, a uniform and specific structure composed of plasma cells or their derivatives, rare metastases, albumosuria and a fatal termination.

Brief History

The first to study a case of multiple myeloma was Watson (1845), who called McIntyre and Bence-Jones in consultation. In 1846 Dalrymple made a microscopic examination of two affected ribs. McIntyre (1850) described it as "Mollities Ossium." Rusticky (1873) claimed the disease was limited to bones and named it myeloma. Buch (1873) described the disease as primary multiple sarcoma of bone marrow; Zahn (1885) as senile osteomalacea, and Marchand (1886) as myelogenous pseudoleukemia. Kohler (1889) called attention to the nearly constant occurrence of albuminuria and peculiar nature of protein involved.

After awakening interest in the disease in Italy in 1897, Bozzolo (1898) analyzed 135 case reports. Wright (1910) indentified tumor cells with plasma cells. Martelli (1913) reviewed the literature in Italy, Walgren (1916) in Sweden and Rosenbloom (1916) in America. In 1928 Geschickter and Copeland reviewed the literature of 425 cases and added thirteen cases placed at their disposal by Bloodgood. The last noteworthy report came from the Mayo Clinic (1942) by Gormley, Pollock, Hall and Beizer. They collected from January 1, 1924 to December 31, 1936—eighty-six cases and to December 31, 1939, forty-one cases, making a total of 127 cases.

Etiology

Multiple myeloma occurs in later life; 80 per cent between forty and seventy years of age, the peak at fifty-five, and the youngest reported at two years. This is the same period when malignant tumors prevail, especially the skeletal tumors, like metastatic carcinoma Myeloma is twice as frequent in males. Heredity, infection, trauma (20 per cent) and blood disturbances (subleukemic leukemia) are all marshalled as etiologic factors. It attacks all races and has been found in England, America, Italy, Scandinavia, Russia, Holland, France, Switzerland, Canada, Australia, South America and Germany. Three to four cases have been found in 4,000 to 9,000 at autopsy. Figures vary greatly, depending perhaps on the search and skill of the pathologist.

Clinical Characteristics

The clinical course of multiple myeloma usually reveals characteristic pains, tumors, fractures and deformities with their accompanying pulmonary, neurologic, nephritic, gastro-intestinal, hematologic and glandular changes and disturbances. In the early stages the pain is vague, intermittent, insidious, rheumatic, wandering and often confined to the back. In 7 per cent of the cases it is located in the lumbar region while in 20 per cent, it is confined to the ribs and chest and radiating or girdle in character. Sometimes it radiates down the lower or upper extremities. Motion or pressure usually aggravates the pain. Then comes a dramatic incident, frequently associated with sudden effort like chopping wood or falling. The pain becomes intense and fracture takes place, often attended by collapse and prostration. As the fracture heals the severe pain subsides and intermittent pains, remissions and exacerbations follow. Then again relative freedom from pain with symptomatic relief may be experienced for some time, until finally the last stage complicated by pulmonary, neurologic and gasro-intestinal disturbances before death, is accompanied by recurrent and progressively more intense pain.

The bone tumors vary from the size of a pea to a hazelnut. The outstanding feature of these tumors is their distribution and multiplicity. In 90 per cent of the cases they involve the ribs, sternum, clavicle and spine. About 40 per cent shows involvement also of the skull and lower extremities. Patients become aware of the tumors by tenderness, palpation, pulsation and pathologic fractures. They are described as elastic, yielding, pliable, malleable and painless except in later stages. Sometimes they decrease very rapidly in size, perhaps due to hemorrhagic absorption, so Roentgen therapy cannot be properly evaluated.

The deformity produces kyphosis (60 per cent), flattening and telescoping of the spinal column. Bowing of the tibia as in Paget's disease or marked bending as in osteomalacia or globose malunion like in von Recklinghausen practically never occurs. The patient stands with protruding abdomen and walks with caution. Tumors may be palpated along the ribs and sternum and crushing of vertebrae and shortening of spinal column is common. In skull involvement there may be interference with mastication or the teeth may fall out as the skull increases in size.

Fractures and dislocation of ribs, clavicle, et cetera, occur spontaneously and in most recent studies appear twice as frequently as metastatic tumors. Multiple fractures, both united and ununited, may be found aiding in the production of pulmonary disorders like bronchitis, emphysema, atelectatic areas, hypostatic pneumonia, asthmatic attacks, pleurisy and terminal pneumonia with empyema. Pressure on the heart from crushed vertebrae or fractured ribs may cause dyspnea, anginal pains and myocardial decompensation. Nervous involvement manifests itself frequently by neuralgia, paraplegia, radiculitis, lightening pains, dysuria or incontinence, Babinski sign, deglutition disturbance, partial blindness or other mental and psychic phenomena.

Gastro-intestinal manifestation like diarrhea, colicky pains, enterocolitis, hematemesis, melena, peptic ulcer and achlorhydria are found mostly as terminal complications. All types of nephritides occur, depending on the renal condition before the involvement by the myeloma. Where no previous nephritis existed, the blood pressure is low. Cystitis, pyelitis, and abscesses in the kidney follow infection secondary to the paraplegias. Bence-Jones bodies occur in the urine in 60 to 80 per cent of the cases.

Metastases are not limited to the bones. They have been found in the liver, spleen, stomach, duodenum, lymph nodes, tonsils, thyroid, suprarenals, ovaries, meninges and as free tumor cells in the blood vessels.

Blood studies reveal primary to secondary anemias, polycythemia and leukopenia (pseudoleukemia or chloroma). In only 23 per cent of the cases is the red blood counted over 4,000,000. The white blood count is normal in 7 per cent of cases, presents a leukocytosis in 23 per cent and a leukopenia in 7 per cent. Blood smears reveal normoblasts, megaloblasts, poikilocytosis, anisocytosis, myelocytes 1 to 10 per cent, eosinophils 1 to 5 per cent and in general mononuclear increase with relative lymphocytosis.

A greasy smear of the blood and rouleau formation is reported by Morissette and Watkins. The blood cholesterol is usually reduced; the albumin-globulin ratio is reversed, but the blood uric acid, calcium, phosphorus, phosphatase, serum sulfate, serum protein, urea, creatinine and sedimentation rate are all elevated.

Roentgen ray findings are mostly in the spine and thoracic cage. Sometimes the skull and pelvis are involved also. The ribs and the sternum show multiple punched out, pea to orange sized areas, and the fifth to twelfth dorsal vertebrae are those in which pathologic fractures are usually found. The distortion of the vertebrae by the globulous tumors and disappearance of discs with rarefaction often leads to a shortening of the spinal column.

Diagnosis, Prognosis and Treatment

Early cases may be confused with lumbago, spondylitis, osteomalacia, osteitis fibrosa cystica or visceral carcinoma with skeletal metastases or even with bronchitis, pleurisy or emphysema. Later, when neural involvement (visceral pains, paraplegia, urinary incontinence, hypostatic pneumonia), chronic nephritis (Bence-Jones, ascending urinary infection), blood changes (anemia, lowered platelets, et cetera) and terminal enterocolitis appear, the diagnosis is readily entertained. A positive diagnosis can be made by biopsy from a sternal puncture.

The prognosis is grave. The average patient after the disease is discovered lives one to two years. Some on record have lived over twelve years. The treatment is limited mostly to symptomatic and palliative measures.

Case Report

The patient was a woman, aged fifty-six, single and housekeeper. She entered the hospital September 30, 1941. For years she suffered from attacks of bronchitis, headaches, dizziness, nervousness and frequent "bouts of fever." She slept well, drank daily one to two cups of coffee, smoked moderately and occasionally took an alcoholic drink. In the fall of 1937 she fell and injured her back.

The present illness began with a low backache following a fall September 15, 1941. The injury aggravated the pre-existing cough and cramps appeared in the legs and toes. At times faintness, weakness and a lack of sphincter control were noticed.

The examination showed a well-nourished but anemic-looking woman with deafness in the left ear, small tonsils, chronic bronchitis, rigid spine with thoracic kyphosis, arthritis of the knees, ankles and hands and varicose veins of the legs. The blood pressure read systolic 170, diastolic 100 mm. of mercury. Urinalysis revealed albumin 4 plus, sugar negative and hyaline casts in the sediment. Bence-Jones protein was present in the urine. Blood examination showed hemoglobin 50, red blood count 2,910,000, white blood count 16,200, polymorphonuclear 56, lymphocytes 38, monocytes 5, eosinophils 7. The pulse was 85 and regular; temperature 100.4 degrees and respirations 20 to the minute. Roentgen findings revealed calcification of the aortic arch, compression fractures of the bodies of the 6th, 8th and 9th dorsal vertebrae associated with much decalcification of the spinal column and pelvis. Hypertrophic changes in the dorsal and lumbar regions were present as well as a thoracic kyphosis.

Blood chemistry gave the following findings: blood calcium 10.8; blood sugar .143 per cent, creatinine 3.91, urea nitrogen 40.8, total urea 86.88. Phenosulfonephthalein excretion was first hour 15 per cent, second hour 10 per cent, total 25 per cent. Sputum examination showed a mixed flora and no tubercle bacilli. Ewald meal gave no Hcl. acid, but lactic acid, a trace of bile, many streptococcic chains, yeast and fungi were found.

Sternal puncture was done on October 25, 1941, and the hematocrit readings and report read: "fat 13 per cent, plasma 49 per cent, myeloid erythroid 25 per cent, erythroid 13 per cent. Differential: plasma cells 69 per cent, myeloblasts 1 per cent, premyelocytes 8 per cent, myelocytes 4 per cent, band cells 13 per cent, megakarocytes 2 per cent, reticulum cells 3 per cent. Conclusions: there appears to be a marked increase in the myeloid erythroid ratio. Normally, this ratio is about 8 per cent. This indicates hyperplastic activity of the marrow. The predominating cell is one of a plasma cell type. That is, a dark staining cell with an eccentrically placed nucleus. There appears to be a suppression of the erythroid element. Diagnosis: Multiple Myeloma."

The patient left the hospital November 23, 1941, and re-entered March 15, 1943, with the complaints of dyspnea, dizziness, headache, orthopnea, fever, pain in cervical, dorsal and lumbar regions, edema of the ankles, intermittent vomiting and diarrhea, nocturia, weakness, and soreness of the mouth. The blood pressure had dropped to systolic 115, diastolic 68 mm. of mercury. After a month the cardiac decompensation was improved and the patient left the hospital only to re-enter June 11, 1943, unconscious and suffering from additional fractures of the spinal column caused by the myeloma. A left pneumonia and empyema were also present. Fever ranged from 102 to 104 degrees. Death occurred June 13, 1943.

The autopsy diagnoses read: (1) multiple myelomas, (2) lobar pneumonia, left lower lobe, (3) empyema of the left pleural cavity, (4) cloudy swelling of the heart, liver, spleen, (5) nephrosclerosis.

Discussion

DR. H. Z. GIFFIN, Rochester: I have been very much interested in Dr. Lepak's presentation of this complex picture. In the last three or four years I have been especially impressed with the relatively large number of patients with severe anemia and without demonstrable changes in the bones. When the blood smear is examined one finds the "sticky" type of blood picture which has been referred to, a very high sedimentation rate is present, and there is a hyperproteinemia with inversion of the albumin-globulin ratio. Sternal marrow may be obtained for examination and myeloma cells found. Undoubtedly we have been missing the diagnosis in a considerable number of cases of this type. Lately, I have also been interested in the possible relationship between primary diffuse amyloidosis and myeloma. I do not refer to the secondary amyloidosis found in association with chronic suppurative conditions and chronic tuberculosis. Recently, a patient was seen whose presenting complaints were sore and swollen finger tips associated with deep papules on the fingers and also about the nose and a macroglossia; the tongue was three or four times normal size. Macroglossia has been recognized as an outstanding feature of certain cases of amyloidosis. While under observation biopsy of the skin revealed evidence of amyloidosis and, moreover, some of the specimens of urine showed the presence of Bence-Jones protein. On sternal aspiration the bone marrow was found to have the characteristics of myeloma. In the light of the experience with this case and certain cases reported in the literature, I have come to feel that every case of primary diffuse amyloidosis should be investigated for the presence of myeloma.

DR. C. E. CONNOR, Saint Paul: The solitary extramedullary plasmocytoma may come first to the otolaryngologist because its most frequent site of location is in the mucous membrane of the upper respiratory tract, the nose, accessory sinuses, nasopharynx, pharynx and larynx.

There is a marked divergence of opinion concerning the frequency of occurrence, the etiology and the malignancy of these tumors. Modern textbooks usually dispose of them by saying that they are fairly common and usually benign but the Mayo Clinic, in a series of 2,885 malignant tumors of the nose, nasopharynx, pharynx and larynx, found only eleven plasmocytomata. This indicates definitely that they are rare, not common.

Many writers think plasmocytomata are of inflammatory origin because plasma cells are so frequently found, together with lymphocytes, in chronic inflammatory lesions; others, considering their histologic structure and clinical course, believe them to be malignant.

When solitary extramedullary plasmocytomata are seen early and while still confined to the mucous membrane, local treatment may result in apparent complete cure for as long as eighteen years; local cure for as long as eight years has been followed by generalized metastasis in the form of multiple myelomata. This latter type of result suggests that there may be some relation, as yet unknown, between solitary extramedullary plasmocytomata and multiple myelomata and, together with the fact that the histologic structure gives no indication of the potential malignancy of the tumor, is ample warrant for considering these tumors as malignant.

DR. H. Z. GIFFIN: Some one has inquired about our experience at the Mayo Clinic with the treatment of myeloma by radio-active phosphorus. Briefly, I would say that the results have not been satisfactory. Very little evidence of improvement has been seen. Twenty-one patients with myeloma have been treated with radio-active phosphorus in the last sixteen months and seven of these have already died.

DR. H. L. ULRICH, Minneapolis: Bence-Jones bodies are often reported as not present. This may be due to improper examination of the urine. Acidulation of the urine with nitric acid rather than acetic acid is essential to bring out a positive test. I recently recalled the three diagnostic periods in the evolution of the study of this disease. First, we used to rely mostly on the x-ray examination; then there was a period when biochemical tests of the blood were emphasized, and now the sternal puncture has come into vogue. The latter has increased the reliability of the diagnosis.

ISLET CELL TUMOR OF THE PANCREAS

Report of a case treated by local excision with complete recovery

MARTIN NORDLAND, M.D.
Minneapolis, Minnesota

Up to August, 1945, according to Good, 150 cases of adenoma of the islands of Langerhans had been reported in the literature. The first islet cell tumor was reported in 1902. An increasing number have been reported in the literature in the past decade. As a result of the studies of the pathology of the adenoma of these cases found at autopsy, as well as those that have been removed surgically, Warren, in 1926, suggested the following criteria for the pathological diagnosis of the adenoma of the islands of Langerhans:

1. That the tumor should be at least 1 mm. in diameter.
2. That the morphology and arrangement of cells composing the tumor should resemble those of the islands of Langerhans.
3. That the tumor should have a capsule.
4. That the surrounding acinar tissue should be compressed.

A review of the studies of the pathology of the adenoma of Langerhans has been well presented in a recent article in Surgery by Dr. Lewis P. Good. The detail of these studies is not relevant in this report. The clinical picture presented by these cases was not recognized until after the discovery of insulin in 1922. Observers noted a similarity of symptoms in patients with insulin shock and patients with hypoglycemia resulting from the presence of tumors of the islands of Langerhans.

The symptomatology and clinical signs presented by patients with islet cell tumors have been carefully observed and has led to the presentation of a triad by Whipple which he believes is very useful in making a diagnosis in these cases:

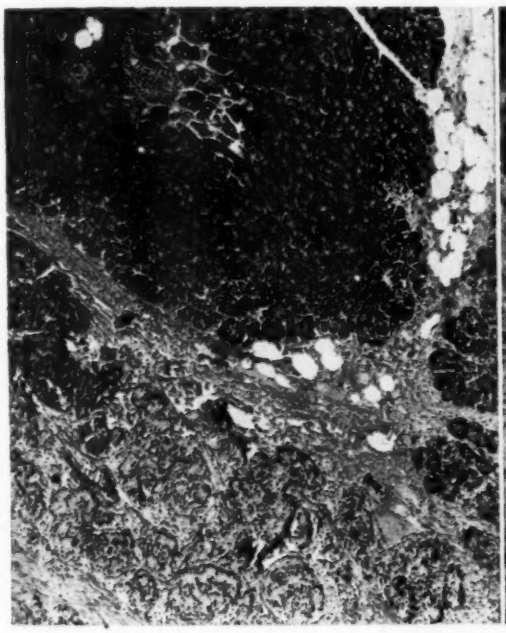

Fig. 1. Typical adenoma of the islands of Langerhans surrounded by a capsule, in the wall of which small ducts and acinar tissue may be seen.

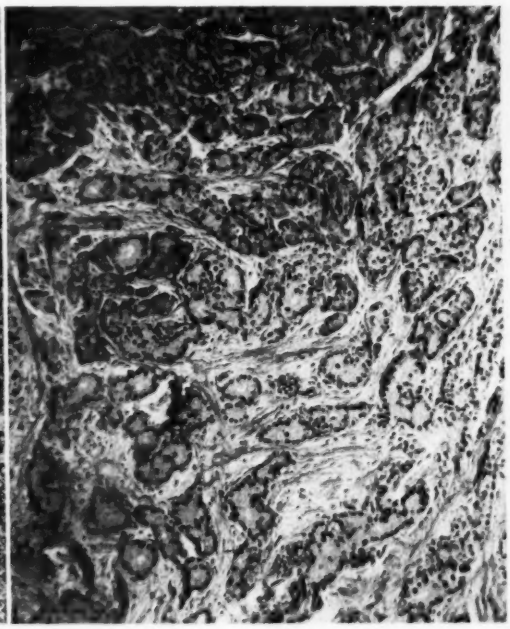

Fig. 2. High power view.

1. Attacks of insulin shock coming on during fasting or an over-fatigued state.
2. Blood sugar findings of 50 mgm. per cent or less.
3. Prompt relief by the ingestion of glucose.

When this triad is present the possibility of islet cell tumor due to an over-supply of insulin must be seriously considered.

Our patient had pre-operatively the triad of symptoms as described by Whipple. The removed specimen fulfilled the criteria for the pathological diagnosis of an adenoma of the islands of Langerhans as suggested by Warren (Figs. 1 and 2). The patient made an excellent recovery after removal of the tumor. For these reasons the following case is reported that it might be added to those previously reported, and that it might be of interest to you.

The patient was a woman, forty years of age, who was admitted to the Northwestern Hospital in Minne-

apolis, with a history of five years' standing. Attacks of weakness, profuse perspiration and prostration associated with pallor recurred with increasing frequency. These attacks occurred mainly after long hours of fasting, frequently occurred in the morning before eating. With the ingestion of food, especially sugar or orange juice, the symptoms would disappear. A few weeks before her admission this syndrome became more severe and the morning before her admission to the hospital she was found unconscious. It was noted that she had sought medical advice frequently but no diagnosis had been made. After her entrance to the hospital it was noted that it was difficult to arouse her. She perspired profusely and her blood pressure was very low.

The only significant fact with reference to her past history was that she had been treated for a questionable toxic goiter by x-ray about a year before admission to the hospital. No symptoms of hyperthyroidism were present at the time of admission. There had been a recent loss of weight.

The significant findings of the physical examination were a rough systolic murmur in the precordium, mainly at the base, with marked hypertension of 226/100. The abdomen was essentially negative.

Laboratory findings: Electrocardiogram suggestive of hypertensive heart disease. Gastro-intestinal study revealed small hiatus hernia. Cholecystogram was normal. Skull films for sella turcica were negative. Glucose tolerance curve started low (53 milligrams per cent) and later followed a diabetic pattern, at three hours showing 180 milligrams per cent. On another occasion the glucose tolerance showed: fasting 33 milligrams per cent, maximum level at one and one-half hours 300 milligrams per cent and at four and one-half hours, 33 milligrams. Cephalin cholesterol was one plus in the twenty-four and forty-eight hours. Serum bilirubin and prothrombin time were within normal limits. Hemoglobin was 57 per cent. These findings were all made by Dr. R. S. Ylvisaker to whom goes the credit of a positive pre-operative diagnosis of an islet cell tumor of Langerhans.

The patient was eventually in good condition for operation. The abdomen was opened through a long transverse upper abdominal incision. This provided a good exposure. The pancreas was approached through the gastrocolic omentum. The patient was quite obese and retroperitoneally there was a dense layer of fat which made it difficult even to recognize the pancreas. The pancreas was palpated through its entirety and a round firm tumor was found at the junction of the neck and the body of the pancreas. This was the only tumor mass found. Removal of the mass revealed that it weighed 5.2 gm. and measured 23 mm. in diameter.

The report by the pathologist was as follows: "The adenoma is surrounded by normal pancreatic tissue; the parenchymal structure of the tumor is almost entirely ductal in origin with a large component of connective tissue stroma. Gomori stain is questionable."

A Penrose drain was placed down to the pancreas at the site of excision of the tumor and the abdomen closed. It is always advisable to drain after an operative procedure on the pancreas. The immediate postoperative condition of the patient was good. Insulin was required but after forty-eight hours the blood sugar level was normal and the glucose tolerance test was that of a normal individual.

Of the 135 cases reported by Good, seventeen cases, or 8 per cent contained multiple tumors. In other words, in one out of every twelve cases of hyperinsulinism due to adenoma the tumor will be multiple. When multiple tumors occur, 75 per cent of them will be found in close proximity to each other while in 25 per cent they are widely separated.

According to the investigators the tumors predominate in the tail where they are superficially located. In the head or body the tumor is usually more deeply situated. This was true in the case here presented. When the tumors are multiple and found in the tail of the pancreas it is necessary to do a resection of that portion of the gland.

Medical therapy can be employed in some of the milder cases with this diagnosis. Cure can only be obtained, however, with the surgical removal of the tumor causing the hyperinsulinism.

This patient who had been severely ill for five years before operation has remained entirely well, is very comfortable physically and much happier mentally. She stated that she had always been irritable and that her family complained about her disposition. She admits that she has had a complete personality change.

Dr. Nordland also reported another case of carcinoma of the duodenum with operation (to be published elsewhere).

Discussion

DR. H. L. ULRICH, Minneapolis: I saw this man in consultation about four months after the symptoms started. There was a history of intermittent jaundice. At no time was he entirely free from jaundice. The stools at times were clay colored, then again normal in color. He had had episodes of pain, fever and chills. His physical examination revealed no loss of weight; there was secondary anemia, distention of the abdomen, with pain on palpation and big liver and spleen. My impression was that he had pancreatitis or a stone in the common duct. I could not entirely dismiss the idea that he might have a malignancy. I thought he ought to be explored. Before doing this, an x-ray of his chest was done. This proved negative and he was explored. It was a total surprise to me. I had never thought of a carcinoma of the duodenum. This particular type of tumor is exceptionally rare.

The rarity of tumors of the duodenum is illustrated by these figures. In Ewing's Pathology it is mentioned. Robertson collected forty cases, the major portion of which were in the mid portion. Howard, *American Journal of Medical Sciences* (206:735, 1943) reports 117,433 postmortems from 1870 to 1937, of which fifty-five were cancers of the duodenum, a percentage of 0.047 per cent. Matter and Hartman, in the *Journal of the American Medical Association* (99:1953, 1932) report that of 176,000 admissions to the Ford Hospital of Detroit, there were six cases of carcinoma of the duodenum, five of them exhibiting jaundice. Eusterman, of the Mayo Clinic, reports the stenosing type more common than those exhibiting jaundice. The growth is three times more common in the male. Howard attempted a clinical syndrome of these tumors. To me there is no particular syndrome. Gastric symptoms, pain, anorexia, weakness and loss of weight, nausea, vomiting, recurrent attacks of obstruction symptoms go with any of the areas contiguous to the duodenum. Anemias, severe and mild, occur, and may be either microcytic, macrocytic, hypo- or hyperchromatic. The latter is more common. Occult blood is quite constant. This again is a constant in malignancy anywhere in the gastro-intestinal tract. From the symptomatology alone there is no sure diagnosis. X-ray examination in proper hands can make the diagnosis, although it is a very difficult job to do.

I called up the physician in charge of this man after he left the hospital and asked him what was the manner of his death. He reported the man died of starvation. There was no jaundice, no obstruction, but he had an intense aversion for food.

In regard to the adenoma of the pancreas so successfully recovered and with such a splendid clinical result, I would like to recall an incident which occurred in this

(Continued on Page 612)

(Continued from Page 610)

room which was the beginning of a clinical development of great historic import. In 1925 I presented the case of a man before this Academy who had had hypoglycemic symptoms for some time. These attacks were so frequent that his wife had to sit up nights and feed him candy or orange juice to keep him from these attacks. This man had a blood sugar tolerance curve which was typical of diabetes. I presented this data to this group, hoping for some suggestions as to diagnosis. But no one volunteered any opinion. He went to the Mayo Clinic! Here they kept him going with a Woodyatt pump which delivers a given amount of sugar intravenously per kilo of body weight in a given time. They at first thought he had liver insufficiency but all liver tests were negative. He was explored. A carcinoma of the islets of the pancreas was found which had metastasized to the liver. They were able to extract insulin from one of these metastatic foci in the liver.

The report of this case by Dr. Wilder made the whole clinical world realize that a malignant growth and even its metastases could function like the normal tissue from which it was derived. This applied to other endocrine glands led us to an entirely new concept of the physiology of the endocrinopathies and today any endocrine gland, particularly the more accessible ones, are surgically attacked when there is clinical indication of hyperfunction.

DR. WALTMAN WALTERS, Rochester: I have enjoyed Dr. Nordland's presentation very much. I haven't a great deal to add, except to mention some of the mistakes I have made in the management of similar cases.

In one patient with a hyperfunctioning adenoma of the islands of Langerhans of the pancreas, which was located at the junction of the body and tail, the approach to the tumor was made through the gastrocolic omentum, as Dr. Nordland did in his case. After the removal of the tumor, the cut edges of the pancreas were sutured together with silk sutures. Contrary to my usual practice of placing a drain down to such an area to enable pancreatic secretion to find its way to the exterior, I neglected to do it in this patient's case. Four or five days later, a palpable mass, approximately 10 cm. in diameter, was noted in the epigastric and left hypochondriac areas. A small amount of barium was given to the patient orally which showed the stomach to have a fishhook conformation as a result of its being pushed mesially. The diagnosis was that pancreatic fluid had accumulated in the lesser peritoneal cavity. This was found to be the case when the incision was made. An opening was made in the gastrocolic omentum and approximately 800 c.c. of clear pancreatic secretion drained out.

It is not always easy to find these small hyperfunctioning tumors in any of the ductless glands, since a tumor only a few millimeters in diameter, as Cushing showed in his description of basophilic adenomas of the pituitary, may produce symptoms of hyperfunction. When hyperfunctioning adenomas of the pancreas or suprarenal are sufficiently large so that they can be seen or palpated, their removal is easy. When tumors are small and but a few millimeters in diameter and located in the substance of the gland, they, of course, are not visualized nor can they be palpated. Obviously, the removal of such tumors necessitates the removal of a portion of the gland containing the tumor.

One patient upon whom I performed a subtotal pancreatectomy, because of surgical symptoms of hyperfunctioning tumor of the islands of Langerhans producing hyperinsulinism, a fringe of the pancreas was left posterior to the duodenum. The patient continued to have symptoms subsequent to operation and died at his home two years later. Through the kindness of the local physician, we were able to obtain the duodenum and remaining portion of the pancreas. The pathologist, on examining the pancreas and attached duodenum by inspection and palpation, was not able to feel or see a tumor, but when serial sections were made a hyperfunctioning adenoma about 8 mm. in diameter was found.

Malignant tumors of the papilla of Vater producing obstructive jaundice are more amenable to surgical exploration with much better results and greater prolongation of life than when the same operation is performed at the head of the pancreas.

In a review of seventy-six cases of radical operation for carcinoma of the ampulla of Vater by the late Dr. Verne C. Hunt† in 1935, he found one case reported by Koerte, where the patient lived for twenty-two years without a recurrence and another reported by Lewis who lived eight and one-half years, and many who lived from two to eight years after the removal of malignant tumors from the papilla Vater. Certainly, in cases of this sort, a radical operation and removal of that portion of the duodenum containing the lower end of the common duct, and restoration of the gastro-intestinal and biliary continuity can and should be carried out and the risk of the procedure is not excessive. On the other hand, with the employment of such surgical technique in the treatment of cancer at the head of the pancreas, the operative risk is higher and the results have not been too good. It is true that prolongation of life for two or three years has been reported in many such cases, but I have had equally good palliative results by relieving the jaundice by simple anastomosis between the gall bladder and stomach or duodenum. I am inclined to think, in studying the reported results of such cases and knowing the frequency with which metastases have recurred in the pancreas, that they are not unlike malignant tumors of the kidney, the resection of which, without the removal of the entire kidney, is usually followed by recurrence of the malignant growth in the remaining portion of the kidney. I think that Dr. Nordland did very well to determine the cause of the biliary obstruction in his patient. Many of these tumors of the papilla Vater are small and difficult to palpate and I am sure that some of them are missed upon exploration.

A few days ago I operated on a patient who was referred to me by a surgical friend of mine who had operated on his biliary tract twice, the last time because of what he believed to be an injury to the duodenum. Upon operation, I found the common bile duct to be hugely dilated. Exploration of the lower end of the duct with a stone scoop brought out a small piece of tissue which, when examined microscopically, proved to be a grade I adenocarcinoma of the duodenum. The lesion was so small that I couldn't feel it and the patient's condition was too poor to attempt a radical removal. An external drainage of the duodenum was performed and I am hoping to do a radical operation when his condition permits.

The meeting was adjourned.

A. E. CARDLE, M.D.
Secretary.

†Hunt, V. C.: Transduodenal resection of the ampulla of Vater for carcinoma of the distal end of the common duct. Surg., Gyn., & Obst., 61:651-662, 1935.

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1. Freed, S. C., and Greenhill, J. P. (1941), J. Clin. Endocrinol., 1:983, December.

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In Memoriam

WALTER D. SHELDEN

Dr. Walter D. Shelden, emeritus member of the staff of the Section on Neurology of the Mayo Clinic, Rochester, Minnesota, died February 13, 1946 at his home in Rochester; he succumbed from a heart ailment.

Dr. Shelden was born February 2, 1870, at Windom, Minnesota; received the degree of B.S. in 1891 from the University of Wisconsin, and a M.D. in 1895 from Rush Medical College; was an intern at Cook County Hospital, Chicago, from 1895 to 1897 and studied at Vienna from 1901 to 1903. He practiced medicine at Reedsburg, Wisconsin, from 1897 to 1901 and at Minneapolis from 1903 to 1913. Dr. Shelden entered the Mayo Clinic in 1913 as head of the Section on Neurology. He was also professor of neurology. Mayo Foundation, Graduate School, University of Minnesota. He was a member of the American Medical Association, the American Neurological Association, the Minnesota Society of Neurology and Psychiatry, the Central Neuropsychiatric Association, the American Psychiatric Association, the Osler Medical Historical Society, the Alumni Association of the Mayo Foundation, Alpha Kappa Kappa, Alpha Omega Alpha, and Sigma Xi. He is survived by his wife and two sons, both of whom are physicians.

It is evident that Dr. Shelden was not deterred by the difficulty of uncharted ways because, when he entered his chosen field, research had yet to uncover many of the facts on which the science of neurology now rests. Dr. Shelden's mastery of his subject; his expertness in golf, in tree culture and in woodwork; his great human tolerance and his totally unpretentious manner springing from a nature free of pretense endeared him to all.

ROBERT GLENN ALLISON

Dr. R. G. Allison, well-known roentgenologist, with offices in Minneapolis and Saint Paul, died at Northwestern Hospital March 20, 1946, at the age of fifty-eight.

He was born in York, South Carolina, November 25, 1887, the son of William Meek Allison and Nancy Glenn Allison. He attended York High School and the University of Maryland, where he received his M.D. degree in 1912. Postgraduate work was carried on at Trudeau Sanatorium, Saranac Lake, New York, and at Cornell University, New York.

From 1912 to 1914 he served as house physician at Trudeau Sanatorium, and from 1919 to 1920 as radiologist at the Municipal Tuberculosis Sanatorium, Chicago, and at Harper Hospital, Detroit, Michigan.

In 1920 he entered private radiological practice in Minneapolis, and became assistant professor of radiology at the University of Minnesota medical school. Later he opened a second office in the Lowry Medical Arts Building, Saint Paul. He was a staff member of the New Asbury Hospital, Abbott Hospital, Northwestern Hospital and Glen Lake Sanatorium.

Dr. Allison enlisted as First Lieutenant in the Medical Corps in 1917, and was discharged February 26, 1919, as Captain.

He was a member of the Minnesota Club of Saint Paul, the Minneapolis Club, the Minneapolis Athletic Club, the Minnekahda Club, the American College of Radiology, the American Roentgen Ray Society, the Radiological Society of North America, the Minnesota Academy of Medicine, the Hennepin County Medical Society and the Minnesota State and American Medical Associations.

Dr. Allison married Helen Bullitt Lowry on May 5, 1922. His widow and one daughter, Margaret Glenn, survive him.

This ability in his chosen specialty and his charming personality made him an outstanding figure among his friends and associates.

MARTIN LUTHER GOLBERG

Martin L. Golberg was born July 30, 1876, at Rock Dell, near Rochester, Minnesota, the son of Olmsted County pioneers. His earliest recollections of medicine were associated with the Mayos, as the elder Doctor Mayo was the family physician. He attended Austin Normal and Luther College at Decorah, Iowa. He entered Hamline with a B.S. degree and was graduated from there in 1901, *cum laude*.

Doctor Golberg first located in Twin Valley, Minnesota, for a few years. He then took postgraduate work in eye, ear, nose and throat diseases in Chicago and practiced a few years in Minneapolis, after which time he moved to Jasper, Minnesota, where he remained for five years. He then returned to Minneapolis, where he practiced the last twenty-four years.

Dr. Golberg was apparently in good health until shortly before his death. He was at home three days the week before he died but returned to his office the two days preceding his death. He suffered a coronary attack and died on February 26, 1946.

In the medical field Doctor Golberg served as medical examiner for various insurance companies and as health officer of Norman, Rock, and Pipestone Counties. He was a member of Hennepin County Medical Society. Minnesota State and American Medical Associations. He

(Continued on Page 616)

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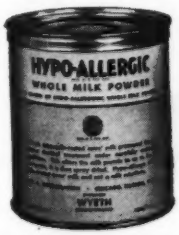

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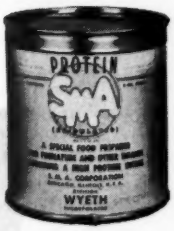

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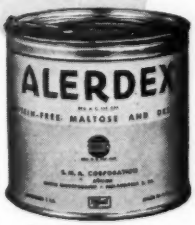

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MARTIN LUTHER GOLBERG

(Continued from Page 614)

was also a member of many fraternal orders, among them Minnehaha Masonic Lodge, and Scottish Rite Lodge, Valley of Saint Paul, and Osman Temple Shrine of Saint Paul. The Masonic lodge had charge of funeral services which were held at the Barney Anderson & Son Funeral Home on March 2, with interment at Acacia Park Masonic Cemetery.

Dr. Golberg is survived by his wife, Emelia Karen, two daughters, Mrs. Joseph P. Facette of Superior, Wisconsin, and Mrs. J. Norman Bong of Minneapolis, a grandson, Dr. Douglas E. Bong, now serving as dental officer on the *U.S.S. Massachusetts*. He is also survived by two brothers, O. O. Golberg and Andrew Golberg, both of Los Angeles and a sister, Mrs. Martin Jacobson, of Brocket, North Dakota.

WILLIAM HENRY PHILLIPS

Dr. William H. Phillips of Jordan, Minnesota, died April 13, 1946, at the age of seventy-six.

He was born in Providence, Rhode Island, May 5, 1871. He graduated from the University of Minnesota Medical School in 1894. After interning at St. Joseph's and Ancker Hospitals, Saint Paul, he began practice in January, 1895. He served as a major in World War I.

On June 10, 1945, his friends celebrated his completion of fifty years in the practice of medicine by tendering him a dinner and ceremonies at the high school auditorium in Jordan, which was attended by 500 friends.

WILLIAM E. ROCHFORD

Dr. William E. Rochford, Minneapolis, died April 3, 1946, at the age of eighty-six. Dr. Rochford was born December 28, 1859, in Albany, New York. He obtained his medical degree from Bellevue Hospital, New York City, in 1889.

Though having the handicap of being blind the last thirty years of his life, he was chief surgeon for the Milwaukee Railroad for fifty years.

He was also a former chief of staff of St. Barnabas and Northwestern Hospitals, and was a member of the Hennepin County Medical Society and the Minnesota State and American Medical Associations, the Western Surgical Association, a charter member of the American College of Surgeons and a diplomate of the American Board of Surgery.

Dr. Rochford is survived by two daughters, Mrs. Ruth Melin of Santa Barbara and Mrs. H. M. Russell-French of Durban, South Africa, and three sons, William of Houston, Texas, Daniel of New York City, and Philip of Minneapolis.

EMANUEL Z. SHAPIRO

Dr. Emanuel Z. Shapiro, Duluth, passed away March 22, 1946, at the age of sixty.

Dr. Shapiro was born in Poland, May 25, 1895. He attended high school at Eveleth, Minnesota, and obtained a B.S. degree from the University of Chicago in

(Continued on Page 618)

EMANUEL Z. SHAPIRO

(Continued from Page 616)

1908. He received his M.D. degree from Rush Medical College in 1910. He interned at Cook County Hospital. On two occasions, in 1924 and 1928, he took postgraduate work in Urology and Dermatology in Vienna.

Dr. Shapiro was a member of the staffs of St. Luke's and St. Mary's Hospitals, and was a member of the St. Louis County Medical Society and of the Minnesota State and American Medical Associations.

He is survived by his widow, a daughter, Marion, and two sons, both recently discharged from the service—Richard, who is at the University of Chicago medical school, and Newell, attending school at Berkeley, California.

MINNEAPOLIS SURGICAL SOCIETY

(Continued from Page 605)

peptic ulcer. I refer to the excessive continuous secretion of gastric juice which occurs in the empty stomach of these patients and which we have found to be neurogenic in origin. I am convinced that there is a good deal to psychosomatic medicine and I should like to see the men who practice that method make use of quantitative measurements whenever they are available. In this case, for instance, it would be most interesting to find out if psychotherapy can decrease the continuous secretion of the empty stomach in ulcer patients and produce a parallel amelioration of symptoms. Such findings would mean more to most surgeons than the most subtle manipulation of words.

Dr. Wangensteen has pointed out that dilatation of the stomach has been observed to follow resection of the lower end of the esophagus in which presumably the vagus nerves have also been excised. I should like to emphasize again that we have found a profound decrease in the tonus and motility of the stomach after section of the vagus nerves and that these effects are most marked for the first three or four days following the operation. If the stomach is kept decompressed during this period, a moderate but definite increase in tonus and motility occurs. If decompression is not done following the operation, an acute dilatation of the atonic stomach may readly occur as a result of swallowed air and the accumulation of secretion.

In reply to Dr. Barron's question concerning the indications for vagus section, I should like to point out that the majority of the patients operated upon to date represent failures of medical management. They are patients who have had ulcers for many years with repeated recurrence of symptoms, repeated severe hemorrhages; in several cases with perforations, and a large number with pyloric obstruction. For the most part, these patients have been referred to surgery and accordingly, section of the vagus nerves has been carried out as a substitute for the more radical and extensive operation of subtotal gastrectomy. It perhaps ought to be pointed out in this connection, however, that the clinical relief following adequate section of the vagus nerves is greater than that secured even by successful medical management. In view of this fact and taking into consideration the difficult and disagreeable features of medical treatment for ulcer, it is quite possible that the operation of vagus section may extend the indications for surgical therapy for this disease.

ERNEST R. ANDERSON, M.D.
Recorder.

Reports and Announcements

MEDICAL BROADCAST FOR JUNE

The following radio schedule of talks on medical and dental subjects by William O'Brien, M.D., Director of Postgraduate Medical Education, University of Minnesota, is sponsored by the Minnesota State Medical Association, the Minnesota State Dental Association, the Minnesota Hospital Association and the University of Minnesota School of the Air.

June		
1—11:30	KUOM-KROC-KFAM	Medicine in the News
6— 1:15	WCCO	Eczema
8—11:30	KUOM-KROC KFAM	Medicine in the News
13— 1:15	WCCO	Rheumatic Fever
15—11:30	KUOM-KROC-KFAM	Medicine in the News
20— 1:15	WCCO	Undulant Fever
22—11.30	KUOM-KROC KFAM	Medicine in the News
25— 1:15	WCCO	Your Community Hospital
27— 1:15	WCCO	Disease of the Gums
29—11:30	KUOM-KROC-KFAM	Medicine in the News

THE AMERICAN CONGRESS OF PHYSICAL MEDICINE

The twenty-fourth annual scientific and clinical session of the American Congress of Physical Medicine will be held September 4, 5, 6 and 7, inclusive, at the Hotel Pennsylvania in New York. Scientific and clinical sessions will be given each day. All sessions will be open to members of the medical profession in good standing with the American Medical Association. In addition to the scientific sessions, the annual instruction courses will be held September 4, 5, and 6. These courses will be open to physicians and to therapists registered with the American Registry of Physical Therapy Technicians. For information concerning the convention and the instruction course, address the American Congress of Physical Medicine, 30 North Michigan Avenue, Chicago 2, Illinois.

SCHERING THOUSAND DOLLAR AWARD FOR MEDICAL STUDENTS

The Schering Award for 1946, a competition open to undergraduate medical students, has recently been announced. Held annually to encourage medical students to acquire further knowledge of various fields of endocrinology, the subject of this year's thousand dollar prize contest will be, "The Role of Hormones in Sterility." Three judges, each prominent in the field of endocrinology, will make the selections, and the award is sponsored by Schering Corporation of Bloomfield, New Jersey, manufacturers of endocrine and pharmaceutical products for the medical profession. For the best thesis submitted on the subject, an award of five hundred dollars will be given. For the second and third best papers, awards of three hundred and two hundred dollars, respectively, will be given. The Schering Award Committee is again receiving an enthusiastic response from medical students in every section of the United States and Canada.

CLAY-BECKER COUNTY SOCIETY

The Clay-Becker County Medical Society held its quarterly meeting in April at the Gopher Hotel in Moorhead. Dr. James W. Duncan, president, reported on the meeting of County Society delegates held in Minneapolis, which he had attended. Discussion during the evening centered on the Federal emergency maternal and infant care program and plans for a prepaid medical care similar to the Blue Cross hospitalization.

The next quarterly meeting will be held at Lake Park Sanatorium and will include a discussion on tuberculosis.

RAMSEY COUNTY SOCIETY

The Ramsey County Medical Society entertained former members of the society who had returned from military service at an informal banquet at the Saint Paul Athletic Club, April 30. Some 260 members and guests attended. Dr. Harry Zimmermann, president of the Society, presided and welcomed the former servicemen on their return to civilian practice. Following the dinner, Dr. W. A. O'Brien of the University Medical School addressed members on "The Trend Toward Medical Specialism." Ninety-eight former members had been in service. The only one to make the supreme sacrifice was Lt. Cmdr. C. H. Mattson.

BLOOD DYSCRASIA

(Continued from Page 577)

sions of the skin. Both of these patients died in our hospital in spite of all treatment. Their histories parallel those of the patients in Cases 1 and 2, except for the cutaneous picture and the terminus.

Treatment in all cases consisted of the repeated transfusion of blood, and administration of liver extract and vitamin supplements. No drugs were administered except to the patient in Case 3; this patient received penicillin intramuscularly.

It may be incorrect to assume that the condition of all these four cases was the same, but it is our opinion that a common factor was, or common factors were, concerned in all four.

WOMAN'S AUXILIARY

MRS. EDWARD V. GOLTZ, *President*
Saint Paul, Minnesota
MRS. JOHN K. BUTLER, *Editor*
Carlton, Minnesota

Blue Earth

Dr. Myron W. Weaver talked to members of the Blue Earth County Auxiliary on "Present Legislative Measures" at the Mankato Clinic on April 29, 1946.

Hennepin

On April 22, Mrs. John F. Curtin opened her home to the Hennepin County Auxiliary for its largest fund-raising project of the year, the Easter Monday benefit musical and tea. Over 200 guests were present making it one of the largest held.

The Auxiliary members furnished the entertainment. Among those who entertained were Amy Wohlrabe, a daughter of one of the members, and Mmes. Russell C. Lindgren, D. D. Anderson, and Ivar Sivertson.

A party was also held in the Medical Arts Building lounge to accommodate those who found it more convenient to be down town.

Mmes. R. C. Logefeil, J. B. Carey and G. F. Nordin were in charge of the entertainment, and Mrs. Elmer Dahl was the organizer. Proceeds from these parties will be distributed among the philanthropic projects sponsored by the Auxiliary.

Kandiyohi-Swift-Meeker

All the officers of the Kandiyohi-Swift-Meeker Auxiliary for 1946-47 are from Willmar. Mrs. S. B. Lindley from the State Hospital is president, and Mrs. J. M. Fisher, also from the hospital, is vice president. Mrs. F. P. Fritch and Mrs. D. L. Jacobs are secretary and treasurer, respectively.

Mower

Mrs. Rolf S. Hegge of Austin was hostess to the Mower County Auxiliary on April 5. The following were elected to office for 1946-47: Mrs. H. B. Allen, Mrs. L. O. Flannagen, Mrs. C. L. Sheedy, and Mrs. Harold Rosenthal.

Olmsted-Fillmore-Dodge

One hundred twenty-five people attended an open meeting at Mayo Foundation House on April 23 at Rochester. Dr. A. R. MacLean spoke on "In Defense of Courage."

New officers are Mrs. W. A. Merritt, Mrs. E. V. Allen, and Mrs. F. M. Feldman, all of Rochester.

Ramsey

Ramsey County Auxiliary finished its surgical dressings for St. Joseph's and St. John's Hospitals at the meeting held April 22 at the Ramsey County Medical library. They also helped the Cancer Society mail out literature.

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Red River Valley

Hotel Crookston, on April 11, was the meeting place for the Red River Valley Auxiliary. Dinner was followed by a short business meeting. Officers for next year will be: Mrs. M. O. Oppegaard, Crookston; Mrs. Edward Bratrud, Thief River Falls; Mrs. A. R. Reff, Crookston; Mrs. C. L. Oppegaard, Crookston.

The group voted to sponsor the cancer essay contests, although only one school has entered—St. Joseph's Academy. War bonds will be the prizes. Judges will be Mrs. L. L. Tygeson, Mrs. C. G. Uhley, and Dr. R. E. Johnson.

Renville

The Auxiliary and Medical Society met for dinner at Olivia Sweet Shop on April 9.

Rice

New officers of the Rice County Auxiliary are Mrs. F. W. Stevenson, president, and Mrs. Norman Lende, secretary and treasurer, both of Faribault.

St. Louis

Mrs. W. A. Coventry was hostess to the St. Louis County Auxiliary on April 9 at which time plans for the open meeting to which 250 guests were invited were made. Mrs. A. J. Bianco, assisted by Mrs. R. N. Mayne, was appointed to be in charge. Dr. Myron Weaver was asked to speak on "Development in Medical Legislation."

Mrs. M. A. Nicholson, with Mrs. W. G. Strobel and Mrs. Cyril Smith, have been very busy furnishing the closet of the Public Health Nurses with equipment which can be taken into the homes they visit. The philanthropic committee is endeavoring to supply the closet with excellent and necessary medical materials.

Southwestern

Southwestern Auxiliary met at the home of Mrs. E. W. Arnold at Adrian on April 9 after the semi-annual banquet which was held jointly with the Medical Society. A short business meeting was held and all officers were re-elected for next year. Mrs. D. E. Nealy is president.

Upper Mississippi

Officers of the Upper Mississippi Auxiliary for 1946-47 will be: President, Mrs. George Holliday, Brainerd; president-elect, Mrs. A. J. Lenarz, Browersville; first vice president, Mrs. G. H. Leemhuis, Aitkin; second vice president, Mrs. A. J. Lenarz, Browersville; secretary, Mrs. A. E. Amunsen, Little Falls; treasurer, Mrs. A. H. Borgesen, Long Prairie.

Waseca

Mrs. J. B. Gallegher of Waseca was hostess to the Waseca County Auxiliary on April 2. New hospital linens were marked. Officers for the year are Mrs. H. M. McIntyre, Waseca, president; and Mrs. George W. Olds, New Richland, secretary-treasurer.

Wright

Mrs. Robert D. Thielen of St. Michael, Minnesota, is president of the Wright County Auxiliary.

Of General Interest

Dr. F. H. Magney of Duluth has been reappointed to the Minnesota State Board of Medical Examiners by Governor Thye. Appointments are for seven-year terms.

* * *

Dr. Robert Lyman Nelson has been discharged from the Army and has resumed the practice of internal medicine at 624 Medical Arts Building, Duluth.

* * *

Dr. Arnold J. Chlad announces the opening of his offices at 1261 Lowry Medical Arts Building, Saint Paul. He will limit his practice to surgery.

* * *

Dr. R. E. Nutting of Duluth is the State Chairman of the American Academy of Pediatrics for Minnesota, succeeding Dr. Roger L. J. Kennedy of the Mayo Clinic.

* * *

Dr. and Mrs. Edward Bratrud have returned to Thief River Falls to resume active work, after spending the winter at Phoenix, Arizona.

* * *

Dr. S. J. Raetz, formerly of Maple Lake, has opened offices for the practice of medicine and surgery in the St. Mary's Building at St. Cloud, Minnesota.

* * *

Announcement has been made of the appointment of Dr. Paul G. Polski, of South Saint Paul, as village health officer for the remainder of 1946.

* * *

Dr. Julius T. Gericke reopened his offices in Glenwood on June 15. Dr. Gericke recently returned from several years' service in the Navy.

* * *

Dr. George E. Cardle, physician and surgeon, has resumed his practice in Brainerd in association with Dr. Earl F. Jamieson, with offices in the Lyceum Building.

* * *

Announcement has been made of the appointment of Dr. Floyd M. Feldman, city health officer of Rochester, to the Health Advisory Group of the Minnesota Committee on Local Health Services.

* * *

Dr. Wm. E. Hall, formerly of Saint Paul, has taken over the practice of Dr. S. J. Raetz of Maple Lake, Minnesota. Dr. Hall was recently discharged from the Army where he was a captain in the ETO.

* * *

Dr. Gaylord W. Anderson, Director of the School of Public Health, University of Minnesota, has recently been elected Secretary-Treasurer of the Association of Schools of Public Health.

* * *

Dr. John F. Madden of Saint Paul has been appointed a member of the Editorial Board of the *Quarterly Review of Dermatology and Syphilology* published by the Washington Institute of Medicine in Washington, D. C.

Dr. William C. Heiam, of Cook, deputy coroner for St. Louis County, talked on cancer at a meeting of the lay committee of the Public Health Service in Virginia, urging periodic examinations as the only guard against the disease.

* * *

Dr. James L. Jaeck has closed his offices at Heron Lake and terminated his practice there. Dr. Jaeck and his family have moved to Minneapolis, but for the immediate future at least, the doctor does not intend to engage in practice.

* * *

While on terminal leave, Lt. Colonel Robert L. Nelson, Duluth physician and surgeon, was presented with the Army Commendation medal for his work as Chief of Medical Service of the 129th General Hospital overseas.

* * *

The reappointment of Dr. Fredolph H. Magney, of Duluth, to the Minnesota State Board of Medical Examiners for a seven-year term has been announced by Governor Thye. Dr. Magney's new term will expire on May 1, 1953.

* * *

Major E. M. Baldigo who, prior to entering the Army, was associated with the Claydon Clinic was in Red Wing on a short visit while on terminal leave. Dr. Baldigo is expected to return to the Clinic as soon as he is discharged from service.

* * *

The War Department has presented Dr. Duncan V. Luth, Duluth physician and surgeon, with a Commendation Ribbon for outstanding service in the China-Burma-India Theatre. Dr. Luth, a lieutenant colonel in the Army, was in service for more than three years.

* * *

After five and a half years in the Army Medical Corps, Dr. Harold C. Johnson has resumed his practice of medicine at Thief River Falls in association with Dr. Orrin G. Linde. Dr. Johnson was on duty in Hawaii, New Guinea and the Philippines for over thirty months.

* * *

Dr. James T. Priestly, of the Mayo Clinic, formerly a lieutenant in the Army Medical Corps, has been awarded an oak-leaf cluster to be added to his bronze star medal for meritorious achievement as Chief of Surgical Service and Commanding Officer of the 237th Station Hospital in the Southwest Pacific.

* * *

Dr. Lawrence H. Heinz and his wife, Dr. Ivy Heinz, of Minneapolis, have rented the offices in Wabasso formerly occupied by Dr. Robert J. Cairns, of Redwood

(Continued on Page 628)

(Continued from Page 626)

Falls, and expect to begin to practice in the near future. Dr. Cairns, now that the war emergency is over, has discontinued his practice at Wabasso.

* * *

Dr. Stephen J. Kruzich, on terminal leave from the Army where he served with the rank of major for over three years, has opened offices at Sleepy Eye. Dr. Kruzich, a graduate of Rush Medical College, Chicago, was practicing in Aberdeen, South Dakota, prior to entering the armed forces.

* * *

Because of his recent illness, which Dr. Herbert B. Aitkins refuses to permit to terminate his practice of fifty years at Le Center, the doctor has moved his offices from the First National Bank Building to his home, so as to be able to take things a bit easier. Dr. Aitkin has occupied the same offices since 1903.

* * *

Dr. J. Arnold Bergen, Mayo Clinic, attended the Centennial Anniversary meeting of the Milwaukee Medical Society, in Milwaukee on May 1. A feature of the celebration was a testimonial dinner in honor of the twenty-fifth anniversary of Dr. Eben J. Carey as Dean of Marquette University.

* * *

Dr. Edward A. Meyerding, Saint Paul, executive secretary of the Minnesota Public Health Association, presented 103 schools in Renville, Yellow Medicine, Chippewa and Lac Qui Parle counties with tuberculosis control certificates. Dr. Lewis Jordan, superintendent of Riverside Sanatorium at Granite Falls, has been in charge of the tuberculosis program in these counties since 1930.

* * *

Dr. Charles L. Steinberg, who served as Commander in the Navy, having been stationed at the Treasure Island Naval Hospital in San Francisco and Base Hospital No. 8, Pearl Harbor, resumed the practice of pediatrics several months ago, with offices at 1118 Lowry Medical Arts Building, Saint Paul.

* * *

Dr. George Eusterman, of the Mayo Clinic, was guest speaker at the meeting of the Nebraska State Medical Association held at Lincoln in May. The subject of his address was "Acute Hepatitis and its Sequalae; Notes on Diagnosis and Treatment." Dr. Eusterman also took part in a symposium on pre-operative and postoperative medical problems in the surgical patient.

* * *

Dr. A. B. Nietfeld, who since his discharge from military service has been doing postgraduate work in obstetrics and diseases of the eye in Minneapolis, has been appointed a member of the staff of the Warren Clinic at Warren, according to an announcement made by Dr. Carle H. Holmstrom, director of the Clinic.

* * *

Dr. Arthur George Davis, chief orthopedic surgeon at the Shriners' Hospital for Crippled Children in Philadelphia, was the guest speaker at the final meeting of the

(Continued on Page 630)

(Continued from Page 628)

Hennepin County Medical Society for the season on May 6. Dr. Davis, one of the lecturers in the post-graduate course at the University of Minnesota, spoke on "Injuries of the Cervical Spine."

* * *

Dr. Kenneth R. Larson, recently discharged from military service, has reopened his offices in the Lowry Medical Arts Building in Saint Paul. Dr. Larson was surgeon for the 18th Naval Construction Battalion and served for eighteen months in the Pacific Area. He is a graduate of Hamline and the University of Minnesota Medical School.

* * *

In appreciation of his services in the interests of Gustavus Adolphus College, St. Peter, Dr. David L. Tilderquist of Duluth was presented with a plaque by the college Alumni Association at an honorary luncheon in Minneapolis. An 1894 graduate, Dr. Tilderquist established several science scholarships at the college for pre-medical students.

* * *

Dr. Bernard E. O'Reilley has opened offices at 642 Lowry Medical Arts Building, Saint Paul, following discharge from naval service. He had a commission as Lieutenant Commander and was stationed at Bainbridge Naval Training Station in Maryland, the Naval Hospital at Portsmouth, Virginia, and at the U.S.S. Rocky Mountain Naval Hospital in Tennessee.

Dr. David A. Burlingame, who was discharged from the army, has become associated with Dr. M. B. Hanson at 435 Lowry Medical Arts Building, Saint Paul, in the practice of radiology. Dr. Burlingame, with the rank of Lieutenant Colonel, was stationed at the San Angelo Army Air Base at San Angelo, Texas, and later went overseas with the 172nd General Hospital.

* * *

Thirteen members of the Southwestern Minnesota Medical Association who recently returned from military service were guests of honor at the meeting on May 13. Included among the doctors singled out for honor were Drs. Walter R. Schmidt, Worthington; Albert I. Balmer and Stanley Chunn, Pipestone; Victor Pancratz, Mountain Lake; Walter B. Wells, Jackson; Ludolf J. Hoyer, Windom, and Gerrit Beckering, Edgerton.

* * *

Dr. James Jennings Warner, Perham, has been joined in practice by Dr. Tobe S. Eberley, formerly of Anoka. Dr. Eberley is a graduate of the University of Minnesota Medical School. He was inducted into the Army in 1941 and served as flight surgeon with the Air Force in England and with the Ninth Air Force on the Continent. He arrived in France five days after the invasion of Normandy.

* * *

Dr. Charles E. Rea has returned after nearly three years of service at Oak Ridge, Tennessee, where as Lieutenant Colonel he served as Commanding Officer of

the hospital established to care for the personnel attached to the atomic bomb project in that locality. He has reopened his office at 917 Lowry Medical Arts Building, Saint Paul, where he will limit his practice to surgery.

* * *

The tenth anniversary of the founding of the Saint Paul Surgical Society was celebrated on April 26 with a formal dinner at the Hotel Saint Paul. The speaker was Dr. Robert L. Sanders, director of the Sanders Clinic, Memphis, Tennessee, who talked on "Surgical Complications of the Duodenal Ulcer." Dr. Harry B. Zimmermann was the first president of the Society and Dr. O. W. Holcomb fills the office at present. Dr. William F. Hartfiel is secretary.

* * *

The Hennepin County Medical Society admitted eight new members and two transfers at the final meeting of the season on May 6. Those elected to membership are: Dr. H. Francis Forsyth, Dr. Nathan K. Jensen, Dr. Herman K. Koschnitzke, Dr. John W. Olson, Dr. John A. Seaberg, Dr. Baxter A. Smith, Dr. Leonard A. Titrud and Dr. Robert F. Werner. The transfers are Dr. Bourne Jerome and Dr. John W. Johnson.

* * *

As soon as he can secure suitable offices, Dr. Ralph Armstrong will open a medical practice in Winnebago. Dr. Armstrong, whose home town is Mahnomen, graduated from the University of Minnesota, and following the completion of his internship enlisted in the Army. He was stationed in the South Pacific Islands for three years, then returned to this country and was assigned to the Army Aviation Hospital at St. Petersburg, Florida, where he remained until his recent return to Minneapolis.

* * *

The Ramsey County Medical Society gave a dinner recently at the Saint Paul Athletic Club in honor of the members who have returned from military service. The principal speaker was Dr. William A. O'Brien, director of postgraduate medical education at the University of Minnesota, who discussed "Trends Toward Medical Specialization."

An address of welcome was made by Dr. Harry B. Zimmermann, who presided at the banquet.

* * *

Dr. William T. Peyton, Director of the Division of Neurosurgery at the University of Minnesota, was guest speaker at the spring meeting and banquet of the Red River Valley Medical Society held in the Red and Gold Room at the Hotel Crookston in Crookston. Dr. Peyton discussed "Herniated Intervertebral Discs." Thirty-five members of the Society, accompanied by their wives, attended.

At the conclusion of the banquet the Ladies Auxiliary held their annual meeting with election of officers.

* * *

Dr. Charles Albert Haberle, of Minneapolis, who received his medical degree from the University of Minnesota in March, will leave shortly for military duty. Dr. Haberly was sworn into the Army as a first lieutenant on June 16, 1945, after completing his internship at

Glen Lake Sanitarium. He received his degree of Bachelor of Science in December, 1943, and was graduated from the School of Medicine on June 15, 1945. He is president of Phi Beta Pi medical fraternity.

* * *

Speaking at a luncheon meeting of the Junior Association of Commerce in Minneapolis, Dr. Vernon L. Lindberg, a former major in the Army Medical Corps who was assigned to duty at the Tennessee Atom Bomb Project for two years, described the safety precautions taken there as the most elaborate in the world. Although more than 85,000 persons were engaged on the project, Dr. Lindberg said the accident rate was kept to normal.

* * *

Dr. Alvin Erickson, formerly in practice in Ivanhoe, has been admitted to partnership in the Long Prairie Clinic by Drs. Arthur H. Borgerson and Maurice E. Moseby.

Dr. Erickson is a graduate of the University of Minnesota, where he took his doctor's degree in 1935. He entered the Army in January, 1941, and was on duty in the Southwest Pacific for fifteen months. At the time of his discharge last February he was a lieutenant colonel.

* * *

A Certificate of Merit has been awarded to Dr. Harold S. Diehl, Dean of the University of Minnesota Medical School, by President Truman in recognition of Dr. Diehl's wartime service.

Dr. Diehl was a member of the government's Procurement and Assignment Service which was charged with the responsibility of obtaining and assigning doctors, dentists, nurses, veterinarians and sanitary specialists for the armed forces.

* * *

Dr. C. H. Hildebrand, formerly of Omaha, is now associated in practice with Dr. William B. Richards at St. Cloud. Following his graduation from the University of Nebraska College of Medicine in 1942, Dr. Hildebrand served a year's internship at Jackson Memorial Hospital in Miami, Florida. He enlisted in the Army and his first assignment was at the Station Hospital at Camp Shelby, Mississippi, where he was Chief of Septic Surgery. From there he was sent overseas with the Fourth Auxiliary Surgical Group in the ETO.

* * *

Major Donald L. Paulson, Chief of the Thoracic Surgical Section, Brooks General Hospital, Fort Sam Houston, was recently awarded the Army Commendation Ribbon for his skill and devotion to duty. A graduate of the University of Minnesota Medical School in 1935, Dr. Paulson completed his postgraduate studies in surgery at the Mayo Foundation, where he received his Ph.D. in 1942. Dr. Paulson will resume civilian practice in Dallas upon separation from service in the near future.

* * *

Lt. Col. Conrad J. Holmberg, Minneapolis, has returned after nearly four years in service and has opened an office at 527 Medical Arts Building. He joined the

26th General Hospital and later was transferred to the 31st Station Hospital, Fort Custer, Michigan and Fort Ord, California, prior to overseas service at New Caledonia where he was Chief of Surgery in eye, ear, nose and throat diseases. The 31st Station Hospital was later stationed at Okinawa and Seoul, Korea, where Lt. Col. Holmberg was Hospital Commander.

* * *

Dr. John J. Garthe, who before entering military service was associated in practice with Dr. J. Anthony Malerich in West Saint Paul, has rejoined Dr. Malerich in a partnership.

A lieutenant colonel in the Army Medical Corps, Dr. Garthe was Chief of Medicine at an Army hospital in Detroit, Michigan, for over three years, and Chief of a Medical Section in a general hospital in the Pacific Theatre for eighteen months. He is a graduate of Loyola College and formerly resided in Chicago and Evanston.

* * *

Dr. Earl V. Wetzel, recently discharged from military service, has opened offices for the practice of medicine and surgery in St. Cloud. A lieutenant colonel in the Army, Dr. Wetzel was flight surgeon with the Fifth Air Force on the West Coast and in the Southwest Pacific for four years. He is a native of Little Falls and took his medical degree at the University of Minnesota in 1940. He interned at St. Mary's Hospital in Minneapolis and had a surgical residency there later. Since his discharge from the Army he has been serving on the staff at St. Mary's.

That the prepaid health insurance plan now under consideration by the State Medical Association is the soundest plan yet presented, was the opinion voiced by Dr. Myron Weaver, Assistant Dean of the University of Minnesota Medical School, in an address at a meeting of the health division at the Minnesota Welfare Conference held at the Lowry Hotel in Saint Paul.

At the same meeting Dr. Viktor O. Wilson, of the Division of Child Hygiene, State Department of Health, reported plans for the state hospital and public health survey.

* * *

Announcement has been made of the affiliation in practice of Dr. John E. Eckdale and Dr. Burton C. Ford at Marshall. Dr. Eckdale had been practicing for two years at Lyle when he was inducted into the armed forces. He served as flight surgeon in the Army Air Force from August, 1942, until February 7, 1946, when he was placed on the inactive list with the rank of captain. He was overseas for ten months and was in action on Okinawa. He is a graduate of the University of Minnesota and served his internship at the Milwaukee County General Hospital.

* * *

Four young physicians from Rochester have reported for duty in the Army at the Medical Department Schools, Brooke Army Medical Center, Fort Sam Houston, Texas. They are: First Lieutenants George T. Joyce, Robert U. Moersch and Edward D. Henderson, all fellows-on-leave from the Mayo Foundation, and Kenneth L. Bauman. Lieutenant Moersch is a graduate

George Dejmek

of the University of Pennsylvania Medical School. The other three graduated from the University of Minnesota.

The Brooke Center, where the medical training program is now centered, is the most complete military medical installation of its kind in the world.

* * *

Dr. Donald S. Branham, Albert Lea, returned April 30, 1946, after five years' service in the Army, to his practice in the offices of Drs. Branham, Whitson and Person.

Dr. Branham was in active duty in the Aleutian Islands as Chief of Surgery for a five-hundred-bed station hospital at the time of the attacks on Dutch Harbor and Midway Island. After twenty-six months overseas, Dr. Branham was stationed in San Francisco, on the surgical staff at the Veterans Administration Center.

Just prior to his release from service he was promoted to the rank of colonel.

* * *

Speaking at a symposium on plastic surgery at a continuation course at the University of Minnesota, Dr. Samuel G. Balkin, consultant to the Veterans Administration, stated that techniques developed during the war have made it possible to complete plastic surgery operations in half the time formerly required. Dr. Balkin, who was in service for fifty-two months, emphasized that these improved techniques are primarily concerned with reconstructive, rather than cosmetic surgery.

Dr. N. Logan Levin, Saint Paul, Clinical Associate Professor of Surgery at the University, and Dr. Fred A. Havens, Sr., Associate Professor, Mayo Foundation, Rochester, also took part in the symposium.

* * *

With her retirement on July 1, Dr. Orianna McDaniel will have completed fifty years of service in the Minnesota Department of Health. Dr. McDaniel came to Minnesota in 1894, following her graduation from the University of Michigan Medical School. She interned at Northwestern Hospital in Minneapolis in 1895 and a year later was appointed bacteriologist at the newly established laboratory of the State Health Department under Dr. Charles N. Hewitt, at a salary of fifteen dollars a month. In 1907 Dr. McDaniel was made head of the Pasteur Institute. Ten years later she was promoted to assistant director of the Division of Preventable Disease, and in 1921 was made director, a position she has held ever since.

* * *

Dr. Robert R. Remsberg, formerly of Kansas City, Kansas, has been appointed an assistant in the office of Dr. Walter H. Valentine at Tracy.

Dr. Remsberg graduated from the University of Kansas Medical School in 1942. Prior to entering medical school he had been a science instructor for several years. On conclusion of his internship at St. Margaret's Hospital in Kansas City, an affiliate of the University, he entered the Army and was sent to the Carlisle Medical Field Service School to prepare for active duty. He served aboard an Army transport in the Atlantic for twenty-seven months, and his ship was among the first at the American beachhead in the invasion of Normandy.

While in Cleveland, Ohio, to assist with the examinations of the American Board of Pediatrics, Dr. Charles A. Aldrich, of the Mayo Clinic, who is president of the Board, also participated in a refresher course in pediatrics and obstetrics, where he presented his "Observations on Normal Behavior in Infants." The course was sponsored by the Cleveland Academy of Medicine, Western Reserve School of Medicine, and the Cleveland Division of Health, with the co-operation of the Anti-tuberculosis League. Later in the same week, Dr. Aldrich attended the meeting of the American Pediatric Association held at Skytop, Pennsylvania, where he delivered his presidential address entitled, "The War Comes Home to Pediatrics."

* * *

Dr. Waltman Walters of Rochester has been commended by the Secretary of the Navy "For outstanding performance of duty as Chief of the Surgical Service and as Surgeon in Charge of the Dependents Unit, United States Naval Hospital, Philadelphia, Pennsylvania, from December 28, 1944, to October 23, 1945. . . . Captain Walters aided materially in organizing and administering a high type of resident training for medical officers in the Philadelphia Naval Hospital, which achieved the recognition and unqualified approval of the American Board for certifying specialists. He maintained effective liasion between the surgical service of the Naval Hospital and the teaching institutions and surgical groups of Philadelphia and rendered counsel and guidance to the Rehabilitation Board while serving as a member of that activity. His professional skill and tireless efforts on behalf of war casualties reflect the highest credit upon himself and the United States Naval Service."

The citation carries with it the right to wear the commendation ribbon.

* * *

The Hennepin County Medical Society reports the return to practice of the following members:

Dr. William S. Eisenstadt has resumed his allergy practice in the Medical Arts Building. A major in the Army, Dr. Eisenstadt entered service in 1942. He served in a hospital in New Guinea for a year and was later Chief of the Allergy Section at the hospital at Fort Warren, Cheyenne, Wyoming.

Dr. Harold T. Gustafson, after two and a half years as a lieutenant commander at a Naval hospital at Barstow, California, is again in his offices in the La Salle Building.

Dr. Charles H. McKenzie has reopened his offices in the Medical Arts Building for the practice of obstetrics and gynecology. A commander in the Navy, he was stationed at a Naval hospital at Bremerton, Washington. More recently he was on duty in Japanese waters.

Dr. Asher A. White has returned to his practice of internal medicine at 1009 Nicollet Avenue. Dr. White entered the Army in 1943 and with the rank of major served in hospitals at the Atomic Bomb Project in Washington and Tennessee.

BOOK REVIEWS

Books listed here become the property of the Ramsey, Hennepin and St. Louis County Medical Libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

THE MANAGEMENT OF FRACTURES, DISLOCATIONS AND SPRAINS. 4th Edition. John Albert Key, B.S., M.D., Clinical Professor of Orthopedic Surgery, Washington University School of Medicine, Associate Surgeon of Barnes, Children's and Jewish Hospitals; and H. Earle Conwell, M.D., F.A.C.S., Orthopedic Surgeon to Tennessee Coal, Iron and Railroad Company and American Cast Iron Pipe Company, Chairman of Committee on Fractures and Traumatic Surgery of the American Academy of Orthopedic Surgeons, etc., etc. 1322 pages. Illus. Price, $12.50, cloth. St. Louis: C. V. Mosby Co., 1946.

CORKY THE KILLER—A Story of Syphilis. Harry A. Wilmer, B.S., M.S., M.B., M.D., Ph.D. in Path. Introduction by Paul A. O'Leary, M.D., Head, Section on Dermatology and Syphilology, Mayo Clinic; Professor of Dermatology and Syphilology, Mayo Foundation, University of Minnesota. Forewords by Joseph Earle Moore, M.D., Associate Professor of Medicine, John Hopkins University, and Kendall Emerson, M.D., Managing Director, National Tuberculosis Association. 67 pages. Illus. Price, $1.00, cloth. New York: American Social Hygiene Association, 1945.

PHYSIOTHERAPY (Vocational and Professional Monographs). Thomas Francis Hennessey, M.D. Dean and Director, Massachusetts School of Physiotherapy, Boston. 23 pages. Price 75c, paper cover. Boston: Bellman Publishing Co., 1946.

THE VENOUS PULSE and Its Graphic Recording. Franz M. Groedel, M.D. Attending Cardiologist, Beth David Hospital, Cardiologist, St. Anthony's Hospital, Consulting Cardiologist, Einhorn Department, Lenox Hill Hospital, New York. 223 pages. Illus. Price, $5.50, cloth. New York: Brooklyn Medical Press, 1946.

SHOCK TREATMENTS and Other Somatic Procedures in Psychiatry. Lothar B. Kalinowsky, M.D. Research Associate in Psychiatry, College of Physicians Surgeons, Columbia University, and New York State Psychiatric Institute and Hospital, Assistant Neurologist, Neurological Institute of New York; Paul H. Hoch, M.D., Assistant Clinical Psychiatrist, New York State Psychiatric Institute and Hospital, Instructor in Psychiatry, College of Physicians and Surgeons, Columbia University. Foreward by Nolan D. C. Lewis, M.D., Professor of Psychiatry, College of Physicians and Surgeons, Columbia University, Director of New York State Psychiatric Institute and Hospital. 294 pages. Illus. Price, $4.50, cloth. New York: Grune & Stratton, 1946.

CORNELL CONFERENCES ON THERAPY. Volume 1. Edited by Harry Gold, M.D., Managing Editor, and David P. Barr, M.D., Eugene F. DuBois, M.D., McKeen Cattell, M.D., and Charles H. Wheeler, M.D. 322 pages. Price, $3.25, cloth. New York: The Macmillan Co., 1946.

SYNOPSIS OF PATHOLOGY. W. A. D. Anderson, M.A., M.D., F.A.C.P. Professor of Pathology and Bacteriology, Marquette University School of Medicine, Pathologist, St. Joseph's Hospital, Milwaukee, former-

ly Associate Professor of Pathology, St. Louis University School of Medicine. 741 pages. Illus. Price, $6.50, semi-flexible binding. St. Louis: C. V. Mosby Co., 1946.

SYNOPSIS OF PHYSIOLOGY. Rolland J. Main, Ph.D., Professor of Physiology, Medical College of Virginia, Richmond. 341 pages. Illus. Price, $3.50, semi-flexible binding. St. Louis: C. V. Mosby Co., 1946.

MEMORIAS DO INSTITUTO BUTANTAN, 1944-1945. Tomo xviii. 258 pages. Illus. Sao Paulo: Revista Dos Tribunais, Ltds., 1945.

MODERN MANAGEMENT IN CLINICAL MEDICINE. F. Kenneth Albrecht, M.D., S.A. Surgeon, U. S. Public Health Service, Kansas State Tuberculosis Consultant; formerly Clinical Director, U. S. Marine Hospital, Baltimore, Md. 1238 pages. Illus. Price, $10.00, cloth. Baltimore: Williams & Wilkins Co., 1946.

THE MANAGEMENT OF OBSTETRIC DIFFICULTIES. Paul Titus, M.D. Third Edition. 1,000 pages. Illus. St. Louis: C. V. Mosby Company, 1945.

The thoroughly devised third edtitions of Titus, "The Management of Obstetric Difficulties" is especially timely. Being, as in its previous editions, a handy helper to one doing obstetrics, this new book should find widespread use by the returning service physician to help him through complications and difficulties. Although considerable material has been added, making the book useful to students, residents, and others as a textbook, he has, as stated in the preface to the second edition, still primarily emphasized the management of minor and major obstetric emergencies.

The simplification of the pelviography discussion is gratifying. The chapter on cesarean section is complete and practical, and cautions physicians regarding pitfalls wherein the occasional operator may encounter disaster. The treatment of the subject of sterility, although sterility is not an obstetric emergency *per se,* is logical and instructive; inclusion of this subject is favored because of its importance. The frequently discussed complications—for instance, placenta previa, abortion, toxemias of pregnancy—are well written with regard to therapy, whereas with regard to etiology and physiology, the discussion (especially of toxemias) might be shortened. The managing of the minor nuisance complaints of pregnant women shows the wisdom of this venerable physician.

The script is well composed and carefully edited, the author having had the excellent help of the Division of Publications, Bureau of Medicine and Surgery, United States Navy.

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